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Each issue of volume 7(1953) contains an author index to abstracts in that issue and a supplement to the Numerical Index of Reports. Subject and author indexes, as well as a cumulation of the Numerical Index of Reports, covering three-month periods are issued as supplements to the sixth, twelfth, and eighteenth issues. The 24th issue will be the annual index for the year, superseding the three index supplements mentioned above.

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NUMERICAL INDEX OF REPORTS

Numerical Index of Official Atomic Energy Reports with Indications of Their Availability

This quarterly cummulation supplements the Numerical Index of Reports with Indications of Their Availability which appears in NSA, Volume 6, No. 24A. No further reference to the lists appearing in Vol. 7 Nos. 1 thru 6A is necessary. As reports are in manuscript form when abstracted for NSA, there may be some delay before the reports will be available at the Depository Libraries. The notation NSA in the Availability column indicates the appearance of a report in its entirety in NSA. In general, this list refers only to those reports abstracted in issues preceding the current one. Orders for items for which prices are indicated should be directed to:

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- ADD - ABSTRACTS OF DECLASSIFIED DOCUMENTS the predecessor of NSA
- NNES - National Nuclear Energy Series, published by the McGraw-Hill Book Company

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3091	7-1150	$0.25
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2023	6-6613	J. Applied Phys. 23, 1409-10(1952)
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NEW NUCLEAR DATA

Summary of New Nuclear Data on Half Lives, Radiations, Relative Isotopic Abundances, Nuclear Moments, Neutron Cross Sections, Reaction Energies, and Masses.

Prepared by National Bureau of Standards Nuclear Data Group with assistance of Readers.

National Bureau of Standards Group: K. Way, C. L. McGinnis, M. Wood, and K. Thew.

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The material cumulated here is that which has appeared in NSA Vol. 7, Nos. 1 through 6A.

ABBREVIATIONS

a	absorption measurement
a$\beta\gamma$	absorption of β's in coincidence with γ's
ace$^-$	absorption of conversion electrons
a coin	measurement by placing absorbers between counters in coincidence
α	total γ-ray conversion coefficient, N_e/N_γ
$\alpha_K,\alpha_L,\ldots$	γ-ray conversion coefficient for electrons ejected from the K,L,... shell
b	coefficient in angular correlation function, $1 + b\cos^2\theta$
B	band spectra method
Beγn	measurement by detection of photoneutrons from Be
$\beta\gamma,\gamma\gamma$	$\beta\gamma$ or $\gamma\gamma$ coincidences
$\beta\gamma(\theta)$	angular correlation of β's and γ's in coincidence
Calc	calculated value from experimental work reported elsewhere
cc	cloud chamber
ce$^-$	conversion electrons
chem	chemical separation of product following reaction
Cpt	Compton electrons
d	(1) deuteron, (2) descendant of, (3) days, when used as superscript
d,p(θ)	angular distribution of protons with respect to deuteron beam
Dγn,Dγp	measurement by detection of photoneutrons or photoprotons from deuterium
$\bar{E}$	average energy
E_0	resonance energy
$E_\beta,E_\gamma,\ldots$	energy of β ray, energy of γ ray,...
E_{dis}	disintegration energy
EA	electrostatic analyzer
E1,E2,...	electric dipole, electric quadrupole
ϵ	electron capture
ϵ_K, ϵ_L	electron capture from K, L shell
f	fission, in abbreviations for methods of production or detection
F-K	Fermi-Kurie β energy distribution plot
$\gamma(\theta$,T)	numbers of γ's as function of angle and temperature
Γ	resonance half-width (the whole width at half-maximum)
g.s.	ground state
I	(1) spin in units of $h/2\pi$; (2) nuclear induction magnetic resonance method
ic	ionization chamber
J	quantum state of compound nucleus in a nuclear reaction. "I" is used to denote the spin of the target nucleus, final nucleus
K/L	α_K/α_L
l	angular momentum of particle absorbed into nucleus
M	molecular or atomic beam resonance method
M1,M2,...	magnetic dipole, magnetic quadrupole...
mb	millibarns
Mic	microwave method
mir	measurement by total reflection of neutron beam from mirror surface
ms	mass spectrometer
μ	(1) magnetic moment in units of nuclear magnetons, (2) micron, 10^{-4} cm
μs	microseconds

osc	pile oscillator method
p	(1) proton, (2) predecessor of
para	paramagnetic resonance method
pc	proportional counter
pe^-	photo electrons
ppl	photoplates or emulsions
q	electric quadrupole moment in units of barns
Q	reaction energy in Mev
s	(1) spectrometer method, (2) seconds, when used as superscript
S	atomic-spectra measurement
scin	scintillation counter
sl	lens spectrometer
sl;ce^-	conversion electrons measured in lens spectrometer
st	strong
$s\pi$	180° spectrometer
$s\pi\sqrt{2}$	double focusing spectrometer
σ	cross section in barns
σ_0	cross section at resonance energy, E_0
σ_a	absorption cross section
σ_{el}	elastic scattering cross section
σ_{in}	inelastic scattering cross section
σ_s	scattering cross section
σ_t	total cross section
t	triton, H^3
τ	half life in units indicated
τ_1,τ_2	half life of upper, lower state
th	thermal
w,vw	weak, very weak
(0.123)	β and γ energy values enclosed in parentheses are given for identification purposes
%	% of disintegrations
†	relative numbers. When used in connection with γ rays, relative numbers of photons, not photons plus conversion electrons, are meant
+,−	even, odd parity

Standard journal abbreviations are used.
All energies are given in Mev and all cross sections in barns unless otherwise stated in the tabular material.

MAGNETIC MOMENT STANDARDS

In order to have a consistent basis for recording data on magnetic moments, results have been based on the following values and are without diamagnetic corrections.

$\mu(H^1) = 2.7934$ nuclear magnetons

This value has been adopted arbitrarily because it is the one used as a base in the Table of H. L. Poss, The Properties of Atomic Nuclei, I. Spins, Magnetic Moments and Electric Quadrupole Moments. (Revised, BNL-26 (T-10), (unclassified).) The values reported in the New Nuclear Data summaries are thus directly comparable with those listed in the survey of Poss.

$\nu(Na^{23})/\nu(H^1) = 0.26450$ E. Bleuler, M. Gabriel, Helv. Phys. Acta 20, 67(1947).

$\nu(D)/\nu(H^1) = 0.153506$ F. Bloch, E. C. Levinthal, M. E. Pachard, Phys. Rev. 72, 1125(1947).

$\nu(B^{11})/\nu(H^1) = 0.320827$ D. A. Anderson, Phys. Rev. 76, 434(1949).

$^{3}_{1}H_{2}$ β^- 0.0180 log ft = 3.006 s
Neutrino mass < 0.250 kev
F-K plot straight down to 5.5 kev
L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 689 (1952).

$^{3}_{2}He_{1}$ I 1/2 M
G.Weinrich, V.W.Hughes, BAPS 28, 1, UA2 (1953).

$^{5}_{2}He_{3}$ Levels He^4(n,n) E_n = 4.14 lc
n,$\alpha(\theta)$ g.s. $P_{3/2}$
1.76 $P_{1/2}$
P.Huber, E.Baldinger, Helv. Phys. Acta 25, 435 (1952).

Level H^3(d,n)He^4 E_n = 0.01 to 1.73 pc
16.65 J = 3/2 +
σ_{max} = 5.1 ± 0.1 for E_d = 0.109
J.P.Conner, T.W.Bonner, J.R.Smith, Phys. Rev. 88, 468 (1952).

Level H^3(d,n)He^4 E_d = 0.015 to 0.125
16.64
σ_{max} = 4.95 for E_d = 0.107
E.J. Stovall, Jr., W.R.Arnold, J.A.Phillips, G.A. Sawyer, J.L.Tuck, Phys. Rev. 88, 159A (1952).

Level H^2(t,n)He^4 E_t = 0.08 to 1.2
t,n(θ) 16.65 J = 3/2 + long counter
σ_{max} = 4.9 ± 0.5 for E_t = 0.165
H.V.Argo, R.F.Taschek, H.M.Agnew, A.Hemmendinger, W.T.Leland, Phys. Rev. 87, 612 (1952).

$^{6}_{2}He_{4}$ τ 0.83^s pc
Li^6(n,p) Li^7(n,d) Be(n,α)
M.E.Battat, F.L.Ribe, Phys. Rev. 88, 159A (1952); 88, 156 (1952).

τ 0.84^s Be^9(n,α)
G.Vendryes, Ann. Phys. 7, 655 (1952).

$^{5}_{3}Li_{2}$ Level He^3(d,p)He^4 E_d = 0.19 to 1.60 pc
16.78 J = 3/2 +
σ_{max} = 0.69 for E_d = 0.400
T.W.Bonner, J.P.Conner, A.B.Little, Phys. Rev 88, 473 (1952).

$^{6}_{3}Li_{3}$ No 3.58 level by Li^6(d,d) E_d = 7.70 sπ
3.58 level was observed by Li^6(p,p)
C.P.Browne, C.K.Bockelman, W.W.Buechner, A.Sperduto, BAPS 28, 1, C9 (1953).

$^{7}_{3}Li_{4}$ Level Li^6(d,p) E_d = 1.5
γ 0.477 sl pe$^-$
R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969 (1952).

$^{7}_{4}Be_{3}$ Level Li^6(d,n) E_d = 1.5
γ 0.429 sl pe$^-$
R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969 (1952).

Level B^{10}(p,α) E_p = 3.333, 1.460 EA
0.429 ± 0.003
D.S.Craig, D.J.Donahue, K.W.Jones, Phys. Rev. 88, 808 (1952).

Levels Li^7(p,n) E_p = 18.3 ppl
4.6
7.1
D.M.Thomson, Phys. Rev. 88, 954 (1952).

$^{8}_{4}Be_{4}$ Levels B^{11}(γ,t) E_γ = 17.6 ppl
2.9 Γ = 1.8
3.4 ± 0.2 Γ = 0.8
4.05 ?
O.Rochat, P.Stoll, Helv. Phys. Acta 25, 451 (1952).

p,$\alpha(\theta)$ Li^7(p,α)He^4 E_p = 0.06 to 0.90
l_p = 1 and 3
F.Hirst, Australian J. Sci. Res. 4A, 284 (1951); 5A, 570 (1952).

$^{9}_{4}Be_{5}$ Levels Be(p,p) E_p = 31.5 scin
2.5 11.6
6.8
R.Britten, Phys. Rev. 86, 283 (1952).

B^{11}(d,αn)Be^8 E_d = 0.425 scin
n's observed, assigned to 2.4 level of Be^9
G.A.Dissanaike, J.O.Newton, Proc. Phys. Soc. 65A, 675 (1952).

$^{10}_{4}Be_{6}$ Levels Be^9(d,p) E_d = 14.3
d,p(θ) g.s. l_n = 1
(3.37) l_n = 1
C.F.Black, BAPS 28, 1, W10 (1953).

Levels Be^9(d,p) E_d = 3.6 lc
d,p(θ) g.s. l_n = 1
(3.37) l_n = 1
H.W.Fulbright, J.A.Brunner, D.A.Bromley, L.M. Goldman, Phys. Rev. 88, 700 (1952).

$Be^{10}_{4\ 6}$ Level Be(d,p) $E_d = 1.2$
γ (3.38) E1 or E2 e^+ spectrum

R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969(1952).

Levels Be(d,p) $E_d = 3.49$ ppl
No states between g.s. and 3.37 level

F.Ajzenberg, Phys. Rev. 88, 298(1952).

d,p(θ) graph Be(d,p) $E_d = 0.40$ ppl

D.de Jong, P.M.Endt, Physica 18, 407(1952).

$B^{10}_{5\ 5}$ |q| 0.105 Solid $B(CH_3)_3$ Mic

H.G.Dehmelt, Z. Phys. 133, 528(1952).

No 1.74 level by B^{10}(d,d) $E_d = 6.9$ sπ
1.74 level was observed by B^{10}(p,p)

C.K.Bockelman, C.P.Browne, A.Sperduto, W.W. Buechner, BAPS 28, 1, C8(1953).

Levels Be(d,n) $E_d = 3.39$ ppl
d,n(θ)

	0 +	
	0.72 +	5.58
	1.75 +	5.93
	2.15 +	6.12
	3.53 +	6.38 −
	4.78	6.58
double	5.14 −	6.77

Possible levels at 5.37, 5.72

F.Ajzenberg, Phys. Rev. 88, 298(1952); 87, 205A(1952); 82, 43 (1951).

Level B^{10}(p,p) $E_p = 2.191$ EA
0.719 ±0.0016
Level value indicates $\tau(0.718\gamma) > 10^{-13}$ s
No other levels for $E_p \leq 4.2$

D.S.Craig, D.J.Donahue, K.W.Jones, Phys. Rev. 88, 808(1952).

$B^{11}_{5\ 6}$ |q| 0.051 Solid $B(CH_3)_3$ Mic

H.G.Dehmelt, Z. Phys. 133, 528(1952).

Levels $Li^7(\alpha,\gamma)$

Level	I*	Level	I*
2.14	1/2 ±	8.93	3/2 +
4.46	5/2 +	9.19	7/2 +
5.03	1/2 ±	9.28	5/2 −
6.81	3/2 +		

*From γ intensities, $\alpha\gamma(\theta)$, and $\gamma\gamma(\theta)$

G.A.Jones, D.H.Wilkinson, Phys. Rev. 88, 423 (1952).

d,p(θ) B(d,p) $E_d = 0.29$ ppl
Graphs for g.s., 2.14, 4.46, and 5.03 levels

P.M.Endt, C.H.Paris, H.M.Jongerius, F.P.G.Valckx, Physica 18, 423(1952).

$C^{12}_{6\ 6}$ Levels C(p,p) $E_p = 31.5$ scin
4.3 9.5
7.5 ? 11 − 17 unresolved group

R.Britten, Phys. Rev. 88, 283(1952).

$C^{12}_{6\ 6}$ Level $N^{15}(p,\alpha)$ $E_p = 1.6$
γ 4.44 sl Cpt
$\tau < 3 \times 10^{-13}$ s Doppler correction

R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969(1952).

Level $C^{12}(n,n\alpha)Be^8$ g.s. $E_n \sim 25$ cc
9.7 $\Gamma = 1.6$

J.D.Jackson, D.I.Wanklyn, BAPS 28, 1, W6(1953).

Levels $B^{11}(p,\alpha)Be^8$ $E_p = 0.13$ to 0.28
p,α(θ) (16.11) 2 + $l_p = 1$ pc
(~16.17) 1 − ? $l_p = 0$

D.M.Thomson, A.V.Cohen, A.P.French, G.W.Hutchinson, Proc. Phys. Soc. 65A, 745(1952).

p,γ(θ) $B^{11}(p,\gamma)$ $E_p = 0.50$
11.8-Mev γ originates from I = 1− level
16.8-Mev γ originates from I = 2+ level

H.Glättli, P.Stoll, Helv. Phys. Acta 25, 455 (1952).

Resonances $C^{12}(\gamma,3\alpha)$ ppl
18.4 24.5
21.8 29.4

F.K.Goward, J.J.Wilkins, Proc. Phys. Soc. 65A, 671(1952).

$C^{13}_{6\ 7}$ Level C(d,p) $E_d = 1.5$
γ 3.082 E1 e^+ spectrum sl pe$^-$
$\tau < 3 \times 10^{-13}$ s Doppler correction

R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969(1952).

Level C^{13}(p,p) $E_p = 8$ s
3.59

J.C.Arthur, A.J.Allen, R.S.Bender, H.J.Hausman, C.J.McDole, Phys. Rev. 88, 1291(1952).

Levels C^{12}(n,n) $E_n = 2.6$ to 4.15
n,n(θ) 7.67 $d_{3/2}$
7.75 $s_{1/2}$
Rise in σ_t at $E_n = 3.6$ not resonance

P.Huber, E.Baldinger, R.Budde, Helv. Phys. Acta 25, 444(1952).

Level C^{12}(n,n) $E_n = 3.62$ scin
n,n(θ) (8.20) $d_{3/2}$

A.E.Remund, R.Ricamo, Helv. Phys. Acta 25, 447 (1952).

d,p(θ) graph C(d,p) $E_d = 0.37$ ppl

B.Koudijs, P.M.Endt, J.M.van der Hart, P.J.W. Palmer, Physica 18, 415(1952).

$C^{14}_{6\ 8}$ Level C^{13}(d,p) $E_d = 1.6$
γ 6.11 sl pe$^-$

R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969(1952).

d,p(θ) graph C^{13}(d,p) $E_d = 0.37$ ppl

B.Koudijs, P.M.Endt, J.M. van der Hart, P.J.W. Palmer, Physica 18, 415(1952).

$N^{14}_{7\ 7}$

γ's	$C^{13}(d,n\gamma)$		$E_d = 1.5$
	0.725*	3.38	sl pe⁻ Cpt
	1.638	5.05	
	2.31	5.69	

*Assignment uncertain

R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969(1952).

No 2.31 level by N(d,d) $E_d = 6.98$ sπ
2.31 level was observed by N(p,p)

C.P.Browne, C.K.Bockelman, W.W.Buechner, A.Sperduto, BAPS 28, 1, C9(1953).

$O^{15}_{8\ 7}$

Levels	$N^{14}(p,\alpha)20.4^m C^{11}$		$E_p = 6.6$
	11.9	12.5	stacked foils
	12.2	13.0	

J.P.Blaser, P.Marmier, M.Sempert, Helv. Phys. Acta 25, 442(1952).

$O^{16}_{8\ 8}$

Level	$O^{16}(p,p)$	$E_p = 8$	s
	6.0		
	6.1		

Doublet separation = 0.087 ± 0.010

J.C.Arthur, A.J.Allen, R.S.Bender, H.J.Hausman, C.J.McDole, Phys. Rev. 88, 1291(1952).

Levels	$F^{19}(p,\alpha\gamma)$		$E_p = 0.874,\ 0.935$
$\alpha\gamma(\theta)$	(6.91)	I = 2 +	sπ scin
	(7.12)	I = 1 −	

J.Seed, A.P.French, Phys. Rev. 88, 1007(1952).

Levels	$F^{19}(p,\alpha\gamma)$		$D(\gamma,p)$ in ppl
γ polarization	(6.91)	even	
	(7.12)	odd	

L.W.Fagg, S.S.Hanna, Phys. Rev. 88, 1205(1952).

Resonances	$O^{16}(\gamma,4\alpha)$	$E_\gamma \leq 20$ to < 70	ppl
	22.6	29.5	
	25.8		

F.K.Goward, J.J.Wilkins, Proc. Phys. Soc. 65A, 671(1952).

Resonances	$O^{16}(\gamma,4\alpha)$	$E_\gamma < 32$	ppl
	22*	29 ?	
	25		

*Alternative modes of disintegration via Be^8, C^{12}

D.L.Livesey, C.L.Smith, Proc. Phys. Soc. 65A, 758(1952).

$O^{17}_{8\ 9}$

Level	O(d,p)	$E_d = 1.5$
γ	0.871	$\alpha = 7 \times 10^{-6}$ sl pe⁻ ce⁻

R.G.Thomas, T.Lauritsen, Phys. Rev. 88, 969(1952).

Levels	$F^{19}(d,\alpha)$		$E_d = 1.8, 2.0$ s
	0.883	5.229	5.95
	3.069	5.397	6.87
	3.856	5.723	6.99 ?
	4.567	5.875	7.37 ?

Relative intensities given

H.A.Watson, W.W.Buechner, Phys. Rev. 88, 1324(1952).

$F^{18}_{9\ 9}$

Resonances	$N(\alpha,p)O^{17}$		$E_\alpha = 5.30$	cc
	1.02	2.48	3.54	
	1.58	2.74	3.80	
	1.96	3.04	4.06	

M.C.Kavadeniz, Istanbul Üniv. Fen Fakült. Mecmuasi 17A, 1(1952).

$F^{19}_{9\ 10}$

Levels	$Ne^{21}(d,\alpha)$	$E_d = 2.129$	s
	0.113		
	0.192		

C.Milielkowsky, W.Whaling, Phys. Rev. 88, 1254(1952).

Levels	$F^{19}(p,p)$		$E_p = 8$ s
	1.37	3.94	4.48
	1.59	4.06	4.59
	2.82	4.41	4.76

J.C.Arthur, A.J.Allen, R.S.Bender, H.J.Hausman, C.J.McDole, Phys. Rev. 88, 1291(1952).

$F^{20}_{9\ 11}$

β^-	5.41	F-K plot linear
γ	1.631	

No $\beta^- > 5.4$ (< 1%) No $\gamma > 1.67$ (< 0.25%)
F^{19}(1.8-Mev d,p); sl pe⁻

D.E.Alburger, Phys. Rev. 88, 1257(1952).

Level	$F^{19}(d,p)$	$E_d = 14.3$
d,p(θ)	g.s.	$l_n = 2$

C.F.Black, BAPS 28, 1, W10(1953).

Levels	$F^{19}(d,p)$		$E_d = 1.5$ to 2.1 s	
0.652	1.309	2.870	3.586	4.275
0.828	1.970	2.966	3.681	4.310
0.938	2.048	3.491	3.961	5.062?
1.059	2.195	3.528	4.079	

Relative intensities given

H.A.Watson, W.W.Buechner, Phys. Rev. 88, 1324(1952).

$Ne^{20}_{10\ 10}$

Resonances	$F^{19}(p,\alpha\gamma)O^{16}$		sπ scin
	E_p	J	
$\alpha\gamma(\theta)$	0.669	1 +	
$\alpha\gamma(\theta)$, $p\gamma(\theta)$	0.874	2 −	
$\alpha\gamma(\theta)$	0.935	1 +	

J.Seed, A.P.French, Phys. Rev. 88, 1007(1952).

Resonances	$F^{19}(p,\alpha)O^{16}$ g.s.			pc
p,α(θ)	E_p	J	Rel. Yield	Γ
	1.09*		0.13*	0.03*
	1.23		0.26*	0.08*
	1.38	2 +	1.0	0.10*
	1.73	0 +	3.0	0.10*
	1.91	1 −	6.0	0.20*

E.B.Paul, R.L.Clarke, W.T.Sharp, BAPS 28, 1, W8(1953); *verbal report.

$_{10}Ne^{21}_{11}$ Levels d,p(θ) — Ne^{20}(d,p) $E_d = 7.8$ ppl

Level	I	l_n
g.s.	$d_{3/2}$*	2
(0.33)	$d_{5/2}$*	2
(1.68)		0 or 1
(2.79)		0

For levels at 3.73, 4.71, 5.44, 5.74, 7.30, $l_n = 1$ or 2

*From relative cross-sections

R.Middleton, C.T.Tai, Proc. Phys. Soc. 65A, 752 (1952).

$_{10}Ne^{22}_{12}$ Levels — $F^{19}(\alpha,p)$ $E_\alpha = 5.30$ ppl

0.57
1.34
2.84

E.Hjalmar, H.Slätis, Arkiv Fysik 4, 323(1952).

$_{11}Na^{22}_{11}$ γ (1.28) $\alpha = 7 \times 10^{-6}$ s ce⁻

G.Hinman, D.Brower, R.Leamer, BAPS 28, 1, S7 (1953).

$_{11}Na^{24}_{13}$ γ 1.3679 ± 0.0010 2.7535 ± 0.0010 s$7\!\!\!/2$ pe⁻

A.Hedgran, D.Lind, Arkiv Fysik 5, 177(1952).

γ (1.38) $\alpha_{pair} = 0.6 \times 10^{-4}$ E2 sl
(2.76) $\alpha_{pair} = 7.1 \times 10^{-4}$ E2

S.D.Bloom, Phys. Rev. 88, 312(1952); 87, 236A(1952); 87, 181(1952).

γ (1.38) $\alpha_{pair} = 3 \times 10^{-5}$ E2 sl
(2.76) $\alpha_{pair} = 8 \times 10^{-4}$ E2

H.Slätis, K.Siegbahn, Arkiv Fysik 4, 485(1952).

Levels — Na^{23}(d,p) ppl

0.472	3.409	3.899
0.564	3.582	3.929
1.341	3.623	4.184
1.844	3.648	4.202
1.884	3.738	4.219
2.464	3.850	4.558
2.561		

A.Sperduto, W.W.Buechner, Phys. Rev. 88, 574 (1952).

Capture γ's — $Na^{23}(n,\gamma)$ 2 crystal scin s

50†	0.48	5†	1.66
18†	0.86	11†	2.0
10†	1.34	24†	2.53*

†Photons per 100 n captures*

J.T.Braid, BAPS 28, 1, J5(1953); *verbal report.

Capture γ's — $Na^{23}(n,\gamma)$ sl pe⁻, Cpt

60†	0.475	20†	2.07
50†	0.877	30†	2.52
20†	1.75		

†Photons per 100 n captures*

H.T.Motz, BAPS 28, 1, J8(1953); *verbal report.

$_{11}Na^{24}_{13}$ Neutron resonances $E_n = 0.12$ to 1
12 resonances, Γ's, J's

P.H.Stelson, W.M.Preston, Phys. Rev. 88, 1354 (1952).

Mg Levels — Mg(p,p) $E_p = 8$ s

3.54
4.71
5.08

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

$_{12}Mg^{24}_{12}$ Levels — Mg(p,p) Al(p,α) $E_p = 8$ s

1.38
doublet 4.13
4.24

g.s. α group not observed

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

$_{12}Mg^{25}_{13}$ Levels — Mg(p,p) $E_p = 8$ s

0.61	2.76	complex ?
1.62	3.41	
1.98	3.91	
2.58		

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

$_{12}Mg^{26}_{14}$ Levels — $Na^{23}(\alpha,p)$ $E_\alpha = 5.30$ ppl

0.40
1.72
2.72

E.Hjalmar, H.Slätis, Arkiv Fysik 4, 323(1952).

pγ scin

	γ		
1.83 level	1.83		
2.97 level	1.14(6†)	2.97(1†)	1.83(6†)
3.97 level	2.14	3.97(vw)	1.83
4.35 level	1.38	1.14	1.83

J.E.May, B.P.Foster, BAPS 28, 1, S8(1953).

Levels — Mg(p,p) s

1.83
2.96

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

$_{13}Al^{27}_{14}$ Levels — Al(n,n) $E_n = 2.4$ scin

0.35 ?
~0.9

H.J.Poole, Phil. Mag. 43, 1060(1952).

$_{13}Al^{28}_{15}$ Levels d,p(θ) — Al^{27}(d,p) $E_d \sim 8$ pc

Level	l_n
g.s. doublet	0
(1.0)	0 (10%), 2 (90%)

J.R.Holt, T.N.Marsham, Proc. Phys. Soc. 65A, 763 (1952).

Al^{28} 13 15

Levels Al(d,p) $E_d = 2.1$ s ppl

0.031	2.652	3.873	4.734	5.372
0.974	2.980	3.900	4.759	5.435
1.015	3.006	3.932	4.837	5.735
1.367	3.291	4.031	4.898	5.755
1.625	3.342	4.115	4.988	5.792
2.137	3.458	4.238	5.007	5.855
2.198	3.532	4.307	5.128	6.011
2.268	3.587	4.457	5.156	6.190
2.484	3.665	4.512	5.169	6.307
2.578	3.695	4.686	5.182	

Relative intensities given

H.A.Enge, W.W.Buechner, A.Sperduto, Phys. Rev. 88, 963(1952).

Al^{29} 13 16

γ 85† 1.28 scin
15† 2.43
No 2.04γ (<4%)

H.Roderick, O.Lönsjö, W.E.Meyerhof, BAPS 28, 1, S9(1953).

Si^{28} 14 14

Resonances $Mg^{24}(\alpha,p)Al^{27}$ $Al^{27}(p,\alpha)Mg^{24}$
Same Si^{28} levels observed in both reactions
Resonances $Mg^{24}(\alpha,\alpha)$ $E_\alpha = 2.7$ to 3.4

S.G.Kaufmann, G.Goldberg, L.J.Koester, F.P.Mooring, Phys. Rev. 88, 673(1952).

Si^{29} 14 15

Levels Si(d,p) $E_d = 14.3$
d,p(θ) g.s. $l_n = 0$
(1.29) $l_n = 2$

C.F.Black, BAPS 28, 1, W10(1953).

Si^{31} 14 17

τ 2.62^h
β^- 1.48 a

A.Wannerblom, K.E.Zimen, E.Ehn, Svensk Kem. Tid. 63, 207(1951).

τ 2.62^h P(d,2p) chem; ic

L.J.de Vries, F.T.H.Veringa, J.Clay, Koninkl. Ned. Akad. Wetenschap., Proc. 55B, 303(1952).

P^{29} 15 14

τ 4.45^s Si^{28}(2.8-Mev d)
γ 0.5% (1.28) scin
2.5% (2.43)
(1.28γ)(0.511γ) (2.43γ)(0.511γ)
No 0.39, 0.76, 1.15, or 2.04γ

H.Roderick, O.Lönsjö, W.E.Meyerhof, BAPS 28, 1, S9(1953).

P^{31} 15 16

Neutron resonances P(n,p)2.6^{h}Si
$E_n = 2.05$ to 3.25

2.25	2.55	2.87	3.15
2.37	2.70	3.02 ?	3.22

I.Nilsson, Trans. Chalmers Univ. Technol., Gothenburg No. 125(1952).

P^{32} 15 17

Levels P^{31}(d,p) $E_d = 14.3$
d,p(θ) g.s. $l_n = 2$
~1.2* $l_n = 0$*

C.F.Black, BAPS 28, 1, W10(1953); *verbal report.

P^{32} 15 17

Levels P^{31}(d,p) $E_d = 7.8$ pc
d,p(θ) g.s. $l_n = 2$
(0.08) $l_n = 2$
(0.52) $l_n = 0(22\%)$, 2(78%)
(1.16) $l_n = 0(33\%)$, 2(67%)
(1.3) $l_n = 0(57\%)$, 2(43%)

J.S.King, E.H.Beach, BAPS 28, 1, W9(1953); verbal report.

Capture γ's $P^{31}(n,\gamma)$ 2 crystal scin s
37† 0.51
17† 1.13
41† 2.19
†Photons per 100 n captures*

J.T.Brald, BAPS 28, 1, J5(1953); *verbal report.

S^{33} 15 18

τ 25^d S^{33}(n,p) chem
β^- 0.246 a
No γ (<3.5%)

T.Westermark, Phys. Rev. 88, 573(1952).

S^{32} 16 16

Levels S^{32}(p,p) $E_p = 8$ s

2.25	4.50	5.04
3.81	4.74	5.83
4.32		

J.C.Arthur, A.J.Allen, R.S.Bender, H.J.Hausman, C.J.McDole, Phys. Rev. 88, 1291(1952); 87, 237A (1952).

S^{33} 16 17

Levels S(d,p) $E_d = 14.3$
d,p(θ) g.s. $l_n = 2$
(0.79) $l_n = 0$

C.F.Black, BAPS 28, 1, W10(1953).

Capture γ's S(n,γ) 2 crystal scin s
60† 0.84
~1.52
40† 2.34
†Photons per 100 n captures*

J.T.Braid, BAPS 28, 1, J5(1953); *verbal report.

Cl^{34} 17 17

τ 32.5^m S(p,n)

N.M.Hintz, N.F.Ramsey, Phys. Rev. 88, 19(1952).

Cl^{36} 17 19

Capture γ's Cl(n,γ) 2 crystal scin s

0.48	1.85*
0.75	2.15*
1.14	2.84

J.T.Braid, BAPS 28, 1, J5(1953); *verbal report.

Capture γ's $Cl^{35}(n,\gamma)$ scin

0.784	2.00
1.15	6.2
1.59	7.7

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Level Cl(d,p) $E_d = 6.9$
d,p(θ) g.s. $l_n = 2$

J.S.King, W.C.Parkinson, Phys. Rev. 88, 141(1952).

$K^{40}_{19\ 21}$ ϵ/β^- 0.06 ms of A
Based on $\tau_{total} = 1.27 \times 10^{8y}$; assumption of 4 sample ages of 1.03×10^{9y}
A.K.Mousuf, Phys. Rev. 88, 150(1952).

D_2 factor corrects F-K plot cc
J.M.Marshall, BAPS 28, 1, S10(1953).

$\Delta M(K^{40}-Ca^{40}) = 1.30 \pm 0.07$ Mev ms
$\Delta M(K^{40}-A^{40}) = 1.49 \pm 0.07$ Mev
W.H.Johnson, Jr., Phys. Rev. 88, 1213(1952).

$K^{40}_{19\ 21}$? Capture γ's K(n,γ) scin
6.0
8.2
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$Ca^{40}_{20\ 20}$ Level Ca(p,p) $E_p = 7.7$ a
3.8
J.A.Harvey, Phys. Rev. 88, 162A(1952).

$Ca^{41}_{20\ 21}$ Levels Ca(d,p) $E_d = 14.3$
d,p(θ) g.s. $l_n = 3$
(1.95) $l_n = 1$
C.F.Black, BAPS 28, 1, W10(1953); verbal report.

$Ca^{41}_{20\ 21}$? Capture γ's Ca(n,γ) scin
6.8
8.2
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$Ca^{48}_{20\ 28}$ $\tau_{\beta\beta}$ $> 10^{14y}$ ppl
Assuming decay energy ≥ 2 Mev
J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

$Sc^{43}_{21\ 22}$ τ 3.9^h
$\beta^+(+\epsilon)$ 28% 0.77 s
72% 1.18
γ 0.375 s pe$^-$
Weak 1.15γ probably in Sc^{44}
Ca^{43}(7-Mev p), Ca(20-Mev α) chem
J.R.Haskins, J.E.Duval, L.S.Cheng, J.O.Kurbatov, Phys. Rev. 88, 876(1952).

$Sc^{46}_{21\ 25}$ Level Sc^{45}(d,p) $E_d = 7.8$ pc
d,p(θ) g.s. ? $l_n = 1$ ($\leq 15\%$)*, 3 ($\geq 85\%$)
J.S.King, E.H.Beach, BAPS 28, 1, W9(1953); *verbal report.

Capture γ's Sc(n,γ) scin
0.152 ($20^s Sc^{46}$)
0.220
7-9 possible lines
No crossover of 0.152 and 0.220 γ's observed
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$Sc^{48}_{21\ 27}$ γ ~100† 0.99 scin pe$^-$
~100† 1.32
No 2.29 γ (<0.1†)
M.W.Miller, Phys. Rev. 88, 516(1952).

Ti Relative abundances $TiCl_4$; ms

A	46	47	48	49	50
%	7.87	7.25	73.9	5.56	5.43

H.C.Mattraw, C.F.Pachucki, AECU-1903(1952); NSA 6, 2526(1952).

Capture γ's Ti(n,γ) 2 crystal scin s
37† 0.33
~100† 1.4
†Photons per 100 n captures*
J.T.Braid, BAPS 28, 1, J5(1953); *verbal report.

Capture γ's Ti(n,γ) scin
1.38
5.0
6.5-7.0
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$Ti^{47}_{22\ 25}$ Levels Ti^{46}(d,p) 82.68% Ti^{46} pc

10†	g.s.	17†	3.09
34†	1.40	50†	3.70
13†	2.39	50†	4.18
32†	2.64		

G.F.Pieper, Phys. Rev. 88, 1299(1952).

$Ti^{48}_{22\ 26}$ Levels* Ti^{47}(d,p) 82.05% Ti^{47} pc

10†	g.s.	150†	4.50
10†	1.33	180†	~4.9
<50†	2.31	250†	~5.2
100†	3.31		

*Longest range p group observed may go to first excited and not g.s.
G.F.Pieper, Phys. Rev. 88, 1299(1952).

$Ti^{49}_{22\ 27}$ Levels Ti^{48}(d,p) 98.90% Ti^{48} pc

10†	g.s.	40†	2.41
90†	1.35	120†	3.11
60†	1.70		

G.F.Pieper, Phys. Rev. 88, 1299(1952).

$Ti^{50}_{22\ 28}$ Levels Ti^{49}(d,p) 77.27% Ti^{49} pc

10†	g.s.	240†	4.88
10†	1.58	190†	5.39
<10†	3.0	330†	5.99
240†	4.14		

G.F.Pieper, Phys. Rev. 88, 1299(1952).

$Ti^{51}_{22\ 29}$ β^- 80% 1.9 V(n) Ti(d) chem; a,s
20% 2.2
γ 0.32 scin
(1.9β)(0.32γ)
L.Koester et al, Z. Phys. 133, 319(1952).

$^{51}_{22}Ti_{29}$

Levels $Ti^{50}(d,p)$ 84.69% Ti^{50} pc

10†	g.s.	8†	1.15?
3†	0.61		1.6?

G.F.Pieper, Phys. Rev. 88, 1299(1952).

No long lived Ti^{51} activity from Ti(th n), ms

Activity in Ti foil due to Ta^{182}, chem

W.Forsling, A.Ghosh, Arkiv Fysik 4, 331(1951).

$^{48}_{23}V_{25}$

β^+ ~95† 0.69 $Sc^{45}(\alpha,n)$ chem; sπ

~5† ~0.82

γ (0.99) scin

100† (1.32)

2† (2.22)

(0.511γ) (0.99γ) (0.511γ) (1.32γ) (0.511γ) (2.2γ)

(1.32γ) (0.99γ) No(0.99γ) (2.2γ) No(1.32γ) (2.2γ)

$\gamma\gamma(\theta)$ indicates I = 4, 2, 0

No ce^- between 0.070 and 0.12

P.L.Roggenkamp, C.H.Pruett, R.G.Wilkinson, Phys. Rev. 88, 1262(1952).

γ ~100† 0.99 scin

~100† 1.32

1.7† 2.29

(0.99γ) (1.32γ) (0.99γ) (0.511γ)

(1.32γ) (0.511γ) (2.29γ, (0.511γ)

M.M.Miller, Phys. Rev. 88, 516(1952).

$^{50}_{23}V_{27}$

$\tau_{\beta,\epsilon}$ > 10^{12y}

S.G.Cohen, Bull. Research Council Israel 2, 195 (1952).

I 6 para

J.M.Baker, B.Bleaney, Proc. Phys. Soc. 65A, 952 (1952).

I 6 para

C.Kikuchi, M.H.Sirvetz, V.W.Cohen, Phys. Rev. 88, 142(1952).

$^{51}_{23}V_{28}$

I 7/2 para

C.Kikuchi, M.H.Sirvetz, V.W.Cohen, Phys. Rev. 88, 142(1952).

Levels V(p,p) E_p = 8 s

0.33	2.43	3.83
0.48	2.65	3.96
1.16	3.11	4.90
1.84	3.41	4.97
2.22	3.58	

No level at 0.267 by (p,p)

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

$^{52}_{23}V_{29}$

Level $V^{51}(d,p)$ E_d = 7.8 pc

d,p(θ) g.s. l_n = 1 (≥75%), 3(≤25%)

J.S.King, E.H.Beach, BAPS 28, 1, W9(1953).

$^{52}_{23}V_{29}$

Capture γ's V(n,γ) scin

5.3	6.8
5.7	7.4

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Cr

Levels Cr(p,p) E_p = 8 s

0.48	3.20	3.80
0.81	3.46	3.99
2.69	3.51	4.07
2.79	3.65	4.78

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

Capture γ's Cr(n,γ) scin

0.880	8.0 – 8.5
5 – 6	8.5 – 9.0

Spectrum very complex at high energies

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$^{51}_{24}Cr_{27}$

γ 21% (0.32) α_K = 0.0015 M1 pc, scin

No 0.267 γ

D.Maeder, P.Preiswerk, A.Steinemann, Helv. Phys. Acta 25, 461(1952).

$^{52}_{24}Cr_{28}$

Levels Cr(p,p) E_p = 8 s

1.45

2.43

3.99

Assignment from agreement with Mn^{52} decay

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

$^{53}_{24}Cr_{29}$

I 3/2 para

|μ| 0.58

K.D.Bowers, Proc. Phys. Soc. 65A, 860(1952).

Level Cr(d,p) E_d = 14.3

d,p(θ) g.s. l_n = 1

C.F.Black, BAPS 28, 1, W10(1953).

$^{53}_{24}Cr_{29}$?

23 α tracks from Fe(th n) E_α~5 ppl

J.P.Lonchamp, J. phys. radium 13, 333(1952).

$^{54}_{24}Cr_{30}$

$\tau_{\beta\beta}$ > 6 x 10^{15y} ppl

Assuming decay energy ≥2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

$^{55}_{24}Cr_{31}$

τ 3.52^m Cr(n,γ) Mn(n,p) chem

β^- 2.85 a

No γ (< 10%)

A.Flammersfeld, W.Herr, Z. Naturforsch. 7a, 649 (1952).

Mn^{55} 25 30 | Levels | $Mn^{55}(p,p)$ | $E_p = 8$ | s

0.13	2.27	3.05
1.00	2.42	3.21
1.30	2.59	3.31
1.56	2.77	3.42
1.91	2.85	3.64

H.J.Hausman, A.J.Allen, J.S.Arthur, R.S.Bender, C.J.McDole, Phys. Rev. 88, 1296(1952).

Mn^{56} 25 31
γ 100† 1.81 $\alpha_{pair} = 5.6 \times 10^{-4}$ E1 sl
100† 2.13 $\alpha_{pair} = 4.6 \times 10^{-4}$ E2? pe$^-$

H.Slätis, K.Siegbahn, Arkiv Fysik 4, 485(1952).

Capture γ's $Mn^{55}(n,\gamma)$ scin
0.090 5.0
0.190 7.2
No crossover of 0.090 and 0.190 γ's observed

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Fe
Capture γ's Fe(n,γ)
0.425
8.5
Isotopic assignment uncertain

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Fe^{56} 26 30
Level Fe(n,n) $E_n = 2.4$ scin
(0.85)

M.J.Poole, Phil. Mag. 43, 1060(1952).

Fe^{57} 26 31
Levels Fe(d,p) $E_d = 14.3$
d,p(θ) g.s. $l_n = 1$
~1.4 $l_n = 1$
~2.6 $l_n = 1$

C.F.Black, BAPS 28, 1, W10(1953).

Capture γ's Fe(n,γ)
6.0
7.4
Assignment from intensities
No line at 1.4 observed

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Fe^{58} 26 32
$\tau_{\beta\beta}$ $> 3 \times 10^{14y}$ ppl
Assuming decay energy ≥ 2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Fe^{59} 26 33
γ (1.10) $\alpha = 1.8 \times 10^{-4}$ s ce$^-$
(1.30) $\alpha = 1.1 \times 10^{-4}$

G.Hinman, D.Brower, R.Leamer, BAPS 28, 1, S7 (1953).

β^-	46%	0.271	F-K plot linear	sl
	54%	0.462	F-K plot linear	
	0.3%	1.560	F-K plot not α or D_2	
γ	2.8%	0.191	$\alpha = 7 \times 10^{-3}$	M1
	57%	1.098	$\alpha = 1.8 \times 10^{-4}$	M1
	43%	1.289	$\alpha = 1.4 \times 10^{-4}$	E2

(0.19γ) (1.1γ) Fe^{58}(pile n,γ); sl ce$^-$, pe$^-$
$\gamma\gamma(\theta)$ agrees with I = 3/2, 5/2, 7/2 scin

F.R.Metzger, Phys. Rev. 88, 1360(1952).

Co
Neutron resonance $E_n = 1$ ev to 5 kev
123 ev $\sigma_o\Gamma^2 = 2.1 \times 10^5$

A.W.Merrison, E.R.Wiblin, Proc. Roy. Soc. 215A, 278(1952).

Co^{56} 27 29
β_1^+ ~3† 0.995 Mn^{55}(20-Mev α) chem; s
β_2^+ ~8† 1.53

L.S.Cheng, J.L.Dick, J.D.Kurbatov, Phys. Rev. 88, 887(1952).

Co^{57} 27 30
β^+ 0.320 Mn^{55}(20-Mev α) chem; s

γ		α_K	K/L		
	<0.018				s ce^-_L
	0.119	~0.7	~6.3	M2,E3	ce$^-$,
	0.133	~0.7	~5.2	E3	pe$^-$

L.S.Cheng, J.L.Dick, J.D.Kurbatov, Phys. Rev. 88, 887(1952).

Co^{58} 27 31 72^d
|μ| 3.5* $\gamma(\theta,T)$
0.805γ is not dipole $\gamma(\theta,T)$
*Based on I = 2

J.M.Daniels, M.A.Grace, H.Halban, N.Kurti, F.N.H. Robinson, Phil. Mag. 43, 1297(1952).

β^+ 0.472 Mn^{55}(20-Mev α) chem; s
γ (0.805) $\alpha_K = 2.9 \times 10^{-4}$ E2 ce$^-$, pe$^-$

L.S.Cheng, J.L.Dick, J.D.Kurbatov, Phys. Rev. 88, 887(1952).

γ (0.805) Electric multipole
Polarization from low temp. aligned nuclei

G.R.Bishop, J.M.Daniels, G.Goldschmidt, H.Halban, N.Kurti, F.N.H.Robinson, Phys. Rev. 88, 1432 (1952).

Co^{60} 27 33 10.7^m
γ 0.059 $\alpha_K = 35$ pc, scin
J.H.Kahn, ORNL-1089(1951).

5.2^y
|μ| 3.5 $\gamma(\theta,T)$
Value of 3.0 (Phys. Rev. 85, 688.) in error

B.Bleaney et al., quoted by J.M.Daniels et al., Phil. Mag. 43, 1297(1952).

γ (1.17) Electric multipole
(1.33) Electric multipole
Polarization from low temp. aligned nuclei

G.R.Bishop, J.M.Daniels, G.Goldschmidt, H.Halban, N.Kurti, F.N.H.Robinson, Phys. Rev. 88, 1432 (1952).

(1.17γ) / (1.33γ) = 0.98 ± 0.04 sπ Cpt

B.S.Dzhelepov et al, Doklady Akad. Nauk USSR 77, 233(1951); NSA 5, 6510(1951).

$\gamma\gamma(\theta)$, $\gamma\gamma$ polarization-direction scin
I = 4$^+$, 2$^+$, 0$^+$

R.M.Kloepper, E.S.Lennox, M.L.Wiedenbeck, Phys. Rev. 88, 695(1952).

Co^{60} 27 33

Capture γ's Co(n,γ) scin
0.220 5.8
1.1 7.0
1.5

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Ni

Relative abundances Ni(CO)$_4$; ms

A	58	60	61	62	64
%	68.0	26.3	1.13	3.66	1.01

H.C.Mattraw, C.F.Pachucki, AECU-1903(1952); NSA 6, 2526(1952).

Ni^{64} 28 36

$\tau_{\beta\beta}$ $>3\times10^{15y}$ ppl
Assuming decay energy ≥ 2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Cu

Capture γ's Cu(n,γ) scin
0.160
6.5 - 7
7 - 8

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Cu^{62} 29 33

τ 9.80^m

J.Goldenberg, M.D.Sousa-Santos, E.Silva, Ciencia cultura 3, 307(1951); Chem. Abst. 46-10926(1952).

Cu^{64} 29 35

$\beta^+\gamma$? No $\beta^-\gamma$

S.Meric, Istanbul Ünlv. Fen Fakült. Mecmuasi 16A, 51(1951).

Zn

Capture γ's Zn(n,γ) scin
1.0
7.5

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Zn^{70} 30 40

$\tau_{\beta\beta}$ $>10^{15y}$
Assuming decay energy ≥ 2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Ga

Neutron resonances E_n = 5 ev to 5 kev
94 ev
290 ev

A.W.Merrison, E.R.Wiblin, Proc. Roy. Soc. 215A, 278(1952).

Ga^{67} 31 36

γ (0.092) $\tau \sim 10^{-6s}$
(0.18γ) (0.30γ)

S.C.Fultz, R.J.Nash, R.L.Woodward, Phys. Rev. 88, 170A(1952).

Ga^{72} 31 42

γ 64† 2.491 ± 0.002 $s\pi\sqrt{2}$ pe$^-$
100† 2.508 ± 0.002

A.Hedgrån, D.Lind, Arkiv Fysik 5, 177(1952).

Ge^{75} 32 43 48^s

τ_1 48^s As^{75}(n,p) Ge^{74}(n,γ)
γ 0.175 scin

A.B.Smith, R.S.Caird, A.C.G.Mitchell, Phys. Rev. 88, 150(1952).

82^m

β^- 15% 0.614 Ge^{74}(n,γ); sl
85% 1.137
γ 0.265 sl pe$^-$,scin
0.408 sl ce$^-$,scin
0.572 sl Cpt,scin
No (1.137β^-)(γ)

A.B.Smith, R.S.Caird, A.C.G.Mitchell, Phys. Rev. 88, 150(1952).

Ge^{76} 32 44

$\tau_{\beta\beta}$ $>2\times10^{16y}$ ppl
Assuming decay energy ≥ 2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

As^{76} 33 43

β^- 3% 0.48 As(pile n); $s\pi\sqrt{2}$
12% 1.76
33% 2.40
52% 2.98 $\Delta I = 2$, yes shape
γ 0.558 $\alpha_K = 0.002$ ce$^-$

E.P.Tomlinson, S.L.Ridgway, Phys. Rev. 88, 170A(1952), verbal report.

Se^{77} 34 43 17^s

γ 0.16 Se(fast n); sl ce$^-$

J.Orring, Arkiv Fysik 4, 469(1952).

γ 0.13 Se(pile n); pc, scin

J.H.Kahn, ORNL-1089(1951).

Br^{79} 35 44

Q(Br^{79})/Q(Br^{81}) = 1.1967 Solid $C_6H_4Br_2$ Mic

E.Manring, C.Brown, D.Williams, BAPS 28, 1, F4, (1953).

Br^{82} 35 47

γ 368† 0.535 s
0.602
353† 0.750
100† 1.02
85† 1.29
40† 1.45

B.Dzhelepov, A.Silant'ev, Doklady Akad. Nauk SSSR. 85, 533(1952); NSA 6-6197(1952).

Br^{84} 35 49

γ st 0.890 scin
w 1.89

L.M.Langer, R.B.Duffield, Quoted by C.M.Huddleston, A.C.G.Mitchell, Phys. Rev. 88, 1350(1952).

Kr^{83} 36 47

τ 1.86^h

L.J.de Vries, F.T.H.Veringa, J.Clay, Koninkl. Ned. Akad. Wetenschap., Proc. 55B, 303(1952).

Kr^{85} 36 49 4.4^h

β^- 85% 0.83 Kr(n,γ) U(n,f) ms; sl
γ 85% 0.1495 $\alpha_K = 0.041$ M1 ce$^-$
γ I.T. 15% 0.3050 K/LM = 7
[β] [e_K^-(0.15γ)]

I.Bergström, Arkiv Fysik 5, 191(1952).

10^y

β^- 0.666 $\Delta I = 2$, yes shape sl
Kr(n,γ) U(n,f) ms

I.Bergström, Arkiv Fysik 5, 191(1952).

Kr^{88} 36 52
β^- 68% 0.52 U(n,f) ms; sl
12% 0.9 ?
20% 2.7 a$\beta\gamma$; sl
γ 0.028 K/LM = 8
[e_K^-(0.028γ)] [~0.5β]; e^-/β = 0.085
S.Thulin, Arkiv Fysik 4, 363(1952).

Rb^{82} 37 45
β^+ 24† 0.175 Br(< 20-Mev α); sl
76† 0.775
γ 0.188 0.464 0.818 ce^-, pe^-
0.248 0.550 1.020
0.322 0.610 1.314
0.389 0.690 1.464
0.423 0.768 v st
C.M.Huddleston, A.C.G.Mitchell, Phys. Rev. 88, 1350(1952).

Rb^{84} 37 47
β^+ ~3† 0.37 ? Br(<20-Mev α); sπ, sl
58† 0.82
39† 1.629 ΔI = 2, yes shape
γ 0.890 scin, sπ,ce^-
No other γ No β^- (vw if present)
(~0.8β^+)(γ) No (1.63β^+)(γ)
C.M.Huddleston, A.C.G.Mitchell, Phys. Rev. 88, 1350(1952).

Rb^{86} 37 49
$\beta\gamma$ polarization - direction
1.08γ no parity change
D.R.Hamilton, A.Lemonick, F.M.Pipkin, BAPS 28, 1, 54(1953); verbal report.

Rb^{87} 37 50
τ 5.90 x 10^{10y} RbI(Tl) scin
β^- 0.275 F-K plot not linear
No ce^- or γ
G.M.Lewis, Phil. Mag. 43, 1070(1952).

τ ≥4.8 x 10^{10y}
No βe^- 4π counter
I.Bähnisch, E.Huster, W.Walcher, Naturwiss. 39, 379(1952).

Rb^{88} 37 51
τ 17.7^m d 2.7^{h}Kr; sl
β^- 13% 2.5 ΔI = 2, yes shape
9% 3.6
78% 5.3
S.Thulin, Arkiv Fysik 4, 363(1952).

Sr^{87} 38 49 2.7^h
τ 2.88^h Sr(d) d 80^{h}Y chem
γ 0.3882 K/LM = 5.8 s
G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

Sr^{88} 38 50
$\tau_{\beta\beta}$ > 3 x 10^{16y} ppl
Assuming decay energy ≥ 2 Mev
J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Y^{82} 39 43
τ ~70^m Y(130-Mev p) p 28^{d}Sr chem
A.A.Caretto, Jr., E.O.Wiig, J. Am. Chem. Soc. 74, 5235(1952).

Y^{83} 39 44
τ 3.5^h Y(130-Mev p) p 38^{h}Sr chem
A.A.Caretto, Jr., E.O.Wiig, J. Am. Chem. Soc. 74, 5235(1952).

Y^{85} 39 46
τ 5^h Y(130-Mev p) p 65^{d}Sr chem
A.A.Caretto, Jr., E.O.Wiig, J. Am. Chem. Soc. 74, 5235(1952).

Y^{87} 39 48 14^h
γ 0.3813 K/LM = 5.4 s
No ce^- in region above 1 Mev
G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

80^h
γ 0.4834 K/LM ~ 7 s
G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

Y^{88} 39 49
γ (0.91) α_K = 3.4 x 10^{-4} E1
(1.85) α_K = 1.7 x 10^{-4} E1,M2
F.R.Metzger, H.C.Amacher, Phys. Rev. 88, 147 (1952).

Y^{91} 39 52 51^m
γ 0.5512 K/LM = 6.0 s
G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

Nb^{92} 41 51
No β^- Nb^{93}(20-Mev p) chem; a,s
γ ~100† 0.933 scin
1† 1.84
H.K.Ticho, D.Green, J.R.Richardson, Phys. Rev. 86, 422(1952); 87, 195A(1952); priv. comm.

Nb^{94} 41 53 6.6^m
γ (0.042) α_K>100 Nb(pile n); pc
J.H.Kahn, ORNL-1089(1951).

Nb^{95} 41 54 90^h
γ (0.22) K/LM = 2.5 sl ce^-
V.S.Shpinel, Zhur. Eksptl' i Teoret. Fiz. 22, 255(1952); Phys. Abst. 55-8254(1952).

Mo
Neutron resonances (ev) E_n = 1 ev to 10 kev
46.3 $\sigma_0\Gamma^2$ = 400
75
140
~440
E.R.Hodgson, J.F.Gallagher, E.M.Bowey, Proc. Phys. Soc. 65A, 992(1952).

Mo^{93} 42 51 6.7^h
τ_1 6.95^h Nb(p,n) chem, rel σ
γ ~ 60$^+$ 0.290 scin
~100$^+$ 0.690
~100$^+$ 1.464
G.E.Boyd, R.A.Charpie, Phys. Rev. 88, 681(1952).

Mo^{100} 42 58
$\tau_{\beta\beta}$ ≥10^{15y} ppl
Assuming decay energy ≥2 Mev
Definite evidence of activity
J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

$_{44}Ru^{99}_{55}$ I 5/2 para
$\mu(Ru^{101})/\mu(Ru^{99}) = 1.09$
J.H.E.Griffiths, J.Owen, Proc. Phys. Soc. 65A, 951(1952).

$_{44}Ru^{101}_{57}$ I 5/2 para
$\mu(Ru^{101})/\mu(Ru^{99}) = 1.09$
J.H.E.Griffiths, J.Owen, Proc. Phys. Soc. 65A, 951(1952).

Rh Neutron resonance (ev) cryst s
1.260
H.H.Landon, V.L.Sailor, H.L.Foote, Jr., BAPS 28, 1, M8(1953).

$_{45}Rh^{99}_{54}$ γ 0.286 Ru(p); $s\pi$ ce⁻
S.C.Fultz, R.J.Nash, R.L.Woodward, M.L.Pool, Phys. Rev. 88, 170A(1952).

$_{45}Rh^{101}_{56}$ γ 0.144 Ru(p); $s\pi$ ce⁻
0.286
No β^+
S.C.Fultz, R.J.Nash, R.L.Woodward, M.L.Pool, Phys. Rev. 88, 170A(1952).

$_{45}Rh^{104}_{59}$ 4.3^m γ 0.052 $\alpha \sim 25$ pc, scin
J.H.Kahn, ORNL-1089(1951).

$_{45}Rh^{104}_{59}$ Capture γ's Rh(n,γ) scin
0.080
0.160
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$_{46}Pd^{105}_{59}$ I 5/2 ? s
μ -0.57
A.Steudel, Z.Phys. 132, 429(1952).

$_{46}Pd^{109?}_{63}$ 4.8^m τ 5^m Pd(pile n)
γ 0.17 $\alpha \sim 1$ scin
J.H.Kahn, ORNL-1089(1951).

Ag Neutron resonance (ev) cryst s
5.24
H.H.Landon, V.L.Sailor, H.L.Foote, Jr.; BAPS 28, 1, M8(1953).

Neutron resonances (ev) E_n = 12 ev to 5 kev
5.15 ± 0.03 52
15.9 $\sigma_o\Gamma^2 = 23$ 66
29.6 125
40
A.W.Merrison, E.R.Wiblin, Proc. Roy. Soc. 215A, 278(1952).

Neutron resonances (ev) E_n = 15 to 100 ev
16.5 40 52 71
30.7 43 56 88
J.S.Levin, W.Y.Kato, H.G.Sjostrand, D.J.Hughes, BAPS 28, 1, M10(1953); verbal report.

$_{47}Ag^{104}_{57}$ τ 27^m d 59^mCd
β^+ 2.70 $s\pi$
γ 0.555
Number of weaker γ's tentatively assigned to Ag^{104}
F.A.Johnson, Proc. Roy. Soc. Canada 46, 135A (1952).

$_{47}Ag^{110?}_{63}$ Capture γ Ag(n,γ) scin
0.187
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$_{48}Cd^{104}_{56}$ τ 59^m Ag(50-Mev p) chem
β^+ 0.93 $s\pi$
γ 0.0666
0.0835
w 0.1498
F.A.Johnson, Proc. Roy. Soc. Canada 46, 135A (1952).

$_{48}Cd^{105}_{57}$ τ 55^m Ag(35-Mev p) chem
β^+ 1.68 $s\pi$
γ 0.0254 (K x ray?)
2.1
F.A.Johnson, Proc. Roy. Soc. Canada, 46, 135A (1952).

$_{48}Cd^{114}_{66}$ Capture γ's Cd^{113}(n,γ) $s\pi$ ce⁻
0.097
0.562
C.T.Hibdon, C.O.Muehlhause, Phys. Rev. 88, 943 (1952); 87, 222A(1952).

Capture γ's Cd(n,γ) sl pe⁻
89^{+} 0.555 11^{+*} 0.80
25^{+*} 0.646 20^{+*} 1.30
$^{+}$Photons per 100 n captures
H.T.Motz, BAPS 28, 1, J8(1953); *verbal report.

Capture γ's Cd(n,γ) scin
0.558
8.5
B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Capture γ's Cd(n,γ) pair s
0.36^{+} 6.82 0.12^{+} 7.84
0.21^{+} 7.67 0.23^{+} 8.48
0.16^{+} 7.73 0.14^{+} 9.05
$^{+}$Photons per 100 n captures
G.A.Bartholomew, B.B.Kinsey, BAPS 28,1, J6(1953).

$_{48}Cd^{116}_{68}$ $\tau_{\beta\beta}$ $> 8 \times 10^{15y}$ ppl
Assuming decay energy ≥ 2 Mev
J.H.Fremlin, M.C.Walters, Proc Phys. Soc. 65A, 911(1952).

$_{48}Cd^{117}_{69}$ τ 2.9^h Cd(d,p) chem
γ 1.2 a
A.H.W.Aten, Jr., M.Boelhouwer, Physica 18, 651 (1952).

In^{111} 49 62 — γ 0.1708 K/LM = 7.0 s; 0.2456 K/LM = 4.8

G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

In^{113} 49 64 1.7^h — γ 0.3917 K/LM = 4.2 s

G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

In^{114} 49 65 50^d — γ 0.1898 K/LM = 1.00 s

G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

72^s — $\gamma\gamma(\theta)$; I = 2,2,0 or 4,2,0 — 50^d In metallic
γ cascade follows ϵ decay of 72^s state

R.M.Steffen, W.Zobel, Phys. Rev. 88, 170A(1952).

In^{115} 49 66 4.5^h — γ 0.3346 K/LM = 3.8 s

G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

In^{116} ? 49 67 — Capture γ's In(n,γ) scin
0.160
0.256
No crossover observed

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Sn^{124} 50 74 — $\tau_{\beta\beta}$ $> 2 \times 10^{15y}$ ppl
Assuming decay energy $\geq$2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Sb^{122} 51 71 3.5^m — γ 0.059 $\alpha(0.059\gamma\ ?) \sim 25$
0.074 Sb^{121}(pile n); pc

J.M.Kahn, ORNL-1089(1951).

Sb^{124} 51 73 60^d — β^- (0.95) $\Delta I = 2$, yes shape? sl
2.27 $\Delta I = 2$, yes shape

		α_K	K/L	
γ	(0.607)	0.0036	7.1	E2
	(1.7)	$\leq 5 \times 10^{-4}$		

D.R.Hutchinson, M.L.Wiedenbeck, Phys. Rev. 88, 699(1952).

γ	154†	0.60	17†	1.35	sπ Cpt
	19†	0.71	100†	1.69	
	6.6†	0.96	10†	2.07	
	4.4†	1.05			

K.Gromov et al., Doklady Akad. Nauk SSSR 86, 255(1952).

γ 1.692 sl pe$^-$

D.E.Alburger, Phys. Rev. 88, 1257(1952).

No $\gamma\gamma(\theta)$, no $\gamma\gamma$ polarization-direction scin
(2.27β^-) (0.60γ) (θ), polarization-direction
I = 3, 2+, 0+

R.M.Kloepper, E.S.Lennox, M.L.Wiedenbeck, Phys. Rev. 88, 695(1952).

Sb^{124} 51 73 60^d — (2.27β^-)(0.60γ) polarization-direction
0.60γ no parity change

D.R.Hamilton, A.Lemonick, F.M.Pipkin, BAPS 28, 1, S4(1953).

(0.60γ) (2.27β) Sb(pile n); scin
(0.60γ) (1.70γ) (0.60γ) (2.06γ)?
(0.60γ) (0.65γ and/or 0.73γ)

S.A.E.Johansson, S.Almquist, Arkiv Fysik 5, 427 (1952); Nature 170, 583(1952).

Te^{124} ? 52 72 — Capture γ Te(n,γ) scin
0.609

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

Te^{130} 52 78 — $\tau_{\beta\beta}$ $> 4 \times 10^{15y}$ ppl
Assuming decay energy $\geq$2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Te^{131} 52 79 25^m — Te(n,γ) chem

τ		24.8^m	
β^-	45%	1.35	$a\beta\gamma$
	55%	2.0	a
γ	30†	0.16	a
	20†	0.7	

$\gamma\gamma$ $\beta\gamma$

K.Geiger, Z. Naturforsch. 7a, 579(1952).

I — Neutron resonances (ev) E_n = 5 ev to 5 kev
19.4 $\sigma_o\Gamma^2 = 23$
29.6
[illegible]

A.W.Merrison, E.R.Wiblin, Proc. Roy. Soc. 215A, 278(1952).

I^{121} 53 68 — τ 1.5^h d 40^mXe, p 17^dTe

B.Dropesky, E.O.Wiig, Phys. Rev. 88, 683(1952).

I^{122} 53 69 — τ 3.4^m d 20^hXe

B.Dropesky, E.O.Wiig, Phys. Rev. 88, 683(1952).

I^{125} 53 72 — γ 0.0354 d 18^hXe; sl ce$^-$
Auger $e^-/(e^-_L + e^-_M$ of 0.035γ) = 1.8
shows ϵ chiefly to 0.035 level

I.Bergström, Arkiv Fysik 5, 191(1952).

I^{131} 53 78 — γ sl pe$^-$, ce$^-$

		α_K*	K/LM	
6†	(0.284)	0.05	3.3	E2
100†	(0.364)	0.02	5.6	E2
10†	(0.638)	α = 0.004		E2
3†	(0.723)	α = 0.003		E2

*Based on α_K = 0.097 for 0.662γ of Cs^{137}

J.R.Haskins, J.D.Kurbatov, Phys. Rev. 88, 884 (1952).

$I^{131}_{53\ 78}$ (0.080γ) (0.284γ) No other γγ scin

S.Almqvist, S.A.E.Johansson, Nature 170, 583 (1952).

$Xe^{121}_{54\ 67}$ τ 40^m p 1.5^hI, I(240-Mev p) chem

B.Dropesky, E.O.Wilg, Phys. Rev. 88, 683(1952).

τ 70^m I(80-Mev p) chem

D.E.Tilley, Proc. Roy. Soc. Canada 46, 135A(1952).

$Xe^{122}_{54\ 68}$ τ 20^h p 3.4^mI, I(240-Mev p) chem

B.Dropesky, E.O.Wilg, Phys. Rev. 88, 683(1952).

τ 19.5^h p 3.4^mI, I(80-Mev p) chem

D.E.Tilley, Proc. Roy. Soc. Canada 46, 135A(1952).

$Xe^{123}_{54\ 69}$ τ 1.7^h p 13^hI, I(240-Mev p) chem

B.Dropesky, E.O.Wilg, Phys. Rev. 88, 683(1952).

$Xe^{123}_{54\ 69}$ τ 2.1^h I(50-Mev p) chem

D.E.Tilley, Proc. Roy. Soc. Canada 46, 135A(1952).

$Xe^{125}_{54\ 71}$ τ 18.0^h Xe(pile n) ms
ε from ratio of Auger e⁻ to ce^-_K

γ	68*	0.054	K/LM = 4.2	sl,
	1*	0.096	K/LM = 5	ce⁻
	1*	0.106	K/LM = 5	
	24*	0.187	K/LM = 4.5	
	7*	0.243	K/LM = 7	
	vw	0.46		scin

*Relative intensity of ce^-_K

I.Bergström, Arkiv Fysik 5, 191(1952).

$Xe^{127}_{54\ 73}$ 34^d τ 25^d Xe(pile n) ms
ε from ratio of Auger e⁻ to ce^-_K

γ	34*	0.057	K/LM = 6.2	sl,
	21*	0.145		ce⁻
	41*	0.170		
	84*	0.2026	K/LM = 4.7	sπ√2
	vw	0.365		scin

*Relative intensity of ce^-_K

I.Bergström, Arkiv Fysik 5, 191(1952).

$Xe^{131}_{54\ 77}$ 12^d
τ 12.0^d d 8^dI ms
γ 0.1639 α_K = 36 M4 sπ√2
K/L = 2.3 L/M = 2.9

I.Bergström, Arkiv Fysik 5, 191(1952).

stable
q −0.12 s
μ +0.683 s

A.Bohr, J.Koch, E.Rasmussen, Arkiv Fysik 4, 455 (1952).

$Xe^{133}_{54\ 79}$ 5.3^d
τ 5.4^d Xe(pile n) U(n,f) ms
β⁻ 0.347 sl
γ 0.081 α_K = 1.5 M1
K/LM = 4.9
[e⁻(0.08γ)] [β]

I.Bergström, Arkiv Fysik 5, 191(1952).

$Xe^{135}_{54\ 81}$ 9.2^h
τ 9.2^h Xe(pile n) U(n,f) ms
β⁻ 0.91 sl
γ 100† 0.25 α_K = 0.054 M1,E2
K/LM = 6.5 sl ce^-_K scin
6† 0.61 scin
[e⁻(0.25γ)] [β]
0.053, 0.148, 0.190 γ's not found

I.Bergström, Arkiv Fysik 5, 191(1952).

$Cs^{128}_{55\ 73}$ τ 3.8^m d 2.4^dBa chem
β⁺ observed with 2.4^dBa belongs to this daughter

M.Lindner, R.N.Osborne, Phys. Rev. 88, 1422(1952).

$Cs^{134}_{55\ 79}$ 2.3^y

β⁻	22%	0.085*		Cs(slow n);	s
	6%	0.28*			
	9%	0.42*			
	65%	0.65*			
γ	137†	(~0.58)	3†	1.15	s pe⁻
	100†	0.788	3†	1.35	
	~2†	~1.0			

K.Gromov, B.Dzhelepov, Doklady Akad. Nauk SSSR 85, 299(1952). *N.Anton'eva et al., ibid.

γγ(θ), γγ polarization-direction scin
I = 4+, 2+, 0+

R.M.Kloepper, E.S.Lennox, M.L.Wiedenbeck, Phys. Rev. 88, 695(1952).

γγ polarization correlation observed
Consistent with 5±, 4+, 2+, 0+

B.L.Robinson, L.Madansky, Phys. Rev. 88, 1065 (1952).

$Cs^{135}_{55\ 80}$ β⁻ 0.210* ΔI = 2, no shape s

L.Lidofsky, E.Alperovitch, C.S.Wu, BAPS 28, 1, 22(1953); *verbal report.

$Cs^{137}_{55\ 82}$ γ 0.6614 K/LM = 4.6 s

G.A.Graves, L.M.Langer, R.D.Moffat, Phys. Rev. 88, 169A and 344(1952).

γ 0.66165 ±0.00015 sπ√2 ce⁻ pe⁻

G.Lindström, K.Siegbahn, A.H.Wapstra, Proc. Phys. Soc. 66B, 54(1953).

γ 0.66160 ±0.00014 cryst

D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

$Ba^{127}_{56\ 71}$ τ 12^m p 5.5^hCs, Cs(190-Mev d)

M.Lindner, R.N.Osborne, Phys. Rev. 88, 1422(1952).

$Ba^{128}_{56\ 72}$ ε ~100% Cs(190-Mev d) chem
β⁺ in 3.8^mCs daughter

M.Lindner, R.N.Osborne, Phys. Rev. 88, 1422(1952).

$Ba^{131}_{56\ 75}$ γ Ba(pile n); s

		α_K	K/LM		
	0.043				ce⁻
	0.065		~3.5		
	0.108		~7		
	0.122		6.0		
10†	0.214	~0.18	2.8	E2	ce⁻, pe⁻
4†	0.241				
7†	0.370	~0.010		E1	
100†	0.494	~0.0045	2.5	E2	

M.W.Elliott, L.S.Chen, J.R.Haskins, J.D.Kurbatov, Phys. Rev. 88, 263(1952).

$Ba^{138}_{56\ 82}$ $\tau_{\beta\beta}$ $>10^{15y}$ ppl
Assuming decay energy ≥ 2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

$La^{140}_{57\ 83}$ γ $s\pi\sqrt{2}$ pe⁻
0.3286 ± 0.0003
0.4867 ± 0.0004
0.8151 ± 0.0007
1.596 ± 0.002

A.Hedgran, D.Lind, Arkiv Fysik 5, 177(1952).

Capture γ La(n,γ) scin
4.5

B.Hamermesh, V.Hummel, Phys. Rev. 88, 916(1952).

$Ce^{143}_{58\ 85}$ Ce^{142}(pile n,γ), U(pile n,f) chem

β^-	100†	0.71	
	133†	1.090	
	100†	1.390	
γ	~20†	0.126	sl pe⁻, scin
		~0.160	
	100†	0.290	
	~20†	0.356	
	~25†	0.660	
		0.72	

Unresolved lower energy β
(0.126γ) (0.160γ)

W.H.Burgus, Phys. Rev. 88, 1129(1952).

$Pr^{141}_{59\ 82}$ I 5/2 para

C.F.Davis et al, Atti accad. nazl. Lincei, Classe sci. fis. mat. e nat. 11, 77(1951). NSA 6-3679.

$Pm^{142}_{61\ 81}$? τ 260^d Nd^{142}(7-Mev p)

J.K.Long, M.L.Pool, D.N.Kundu, Phys. Rev. 88, 171A(1952).

$Pm^{143}_{61\ 82}$? τ 320^d Nd^{143}(7-Mev p)

J.K.Long, M.L.Pool, D.N.Kundu, Phys. Rev. 88, 171A(1952).

$Pm^{145}_{61\ 84}$? τ 16^d Nd^{145}(7-Mev p)
β^+ 0.45

J.K.Long, M.L.Pool, D.N.Kundu, Phys. Rev. 88, 171A(1952).

$Pm^{146}_{61\ 85}$ τ $\sim 2^y$ Nd^{146}(7-Mev p)
β^- 0.75

J.K.Long, M.L.Pool, D.N.Kundu, Phys. Rev. 88, 171A(1952).

$Sm^{150}_{62\ 88}$ Capture γ's Sm^{149}(n,γ) $s\pi$ ce⁻
0.337 K/L~4.4
0.440 K/L~3

C.T.Hibdon, C.O.Muehlhause, Phys. Rev. 88, 943(1952); 87, 222A(1952).

$Sm^{151}_{62\ 89}$ β^- ~0.075 Sm(th n); pc
γ 0.019 pc
(0.019γ) (β^-) scin

H.W.Wilson, G.M.Lewis, Proc. Phys. Soc. 65A, 656(1952).

$Eu^{155}_{63\ 92}$ β^- ~0.150 Sm(th n,$\gamma\beta^-$); pc
~0.250
γ 0.015 pc
(~0.150β^-) (γ) (β^-) (0.015γ)

H.W.Wilson, G.M.Lewis, Proc. Phys. Soc. 65A, 656(1952).

$Gd^{153}_{64\ 89}$ γ 0.1037 K/L = 5 $s\pi$ ce⁻
No other γ Gd(pile n)

J.M.Cork, J.M.LeBlanc, W.H.Nester, F.B.Stumpf, Phys. Rev. 88, 685(1952).

$Gd^{156,158}_{64}$ Capture γ's Gd(n,γ) $s\pi$ ce⁻
0.079 K/L~0.3 L/M~2.5
0.088
0.180

C.T.Hibdon, C.O.Muehlhause, Phys. Rev. 88, 943(1952); 87, 222A(1952).

$Tb^{161}_{65\ 96}$ τ 6.8^d Gd(pile n); $s\pi$ ce⁻
γ 0.049 L/M = 3.7
No other γ

J.M.Cork, J.M.LeBlanc, W.H.Nester, F.B.Stumpf, Phys. Rev. 88, 685(1952).

$Dy^{165}_{66\ 99}$ 1.3^m γ 0.102 Dy(pile n); scin

J.H.Kahn, ORNL-1089(1951).

Capture γ's Dy(n,γ) $s\pi$ ce⁻
0.082
0.106
0.189

C.T.Hibdon, C.O.Muehlhause, Phys. Rev. 88, 943(1952); 87, 222A(1952).

Ho Neutron resonances (ev) E_n = 0.1 to 30 ev cryst s
3.96
12.8

H.L.Foote, Jr., V.L.Sailor, H.H.Landon, BAPS 28, 1, M7(1953).

Er Neutron resonances (ev) E_n = 0.1 to 30 ev cryst s
0.51 9.55 21.2
6.10 16.0 27.5

H.L.Foote, Jr., V.L.Sailor, H.H.Landon, BAPS 28, 1, M7(1953).

Er^{167} 68 99

|Q| 10.2 para

G.S.Bogle, H.J.Duffus, H.E.D.Scovil, Proc. Phys. Soc. 65A, 760(1952).

Tm

Neutron resonances (ev) E_n = 0.1 to 30 ev cryst s
3.96
15.0
18.0

H.L.Foote, Jr., V.L.Sailor, H.H.Landon, BAPS 28, 1, M7(1953).

Tm^{170} 69 101

β^- 24% 0.884 Tm(pile n); sl $\beta\gamma$
76% 0.968 sl
γ 0.0841 $\tau = 1.57 \times 10^{-9s}$
$\alpha_K = 1.6$ $\alpha_L = 4.1$ $\alpha_M = 1.2$ E2
$\epsilon_K < 0.3\%$ (β) (0.084γ)
No other γ's (<0.02%)
F-K plots of both β's linear

R.L.Graham, J.L.Wolfson, R.E.Bell, Can. J. Phys. 30, 459(1952).

Yb 70 ? 6^s

γ 0.21 Yb(pile n); scin
0.10 (Dy impurity?)

J.H.Kahn, ORNL-1089(1951).

Lu

Neutron resonances (ev) E_n = 0.1 to 30 ev
1.57 5.3 14.4 cryst s
2.62 11.4 24.0
4.80

H.L.Foote, Jr., V.L.Sailor, H.H.Landon, BAPS 28, 1, M7(1953).

Lu^{176} 71 105

Neutron resonance (ev) cryst s
0.142

H.L.Foote, Jr., V.L.Sailor, H.H.Landon, BAPS 28, 1, M7(1953); verbal report.

Hf^{179} 72 107 19^s

γ 0.22 Hf(pile n); scin

J.H.Kahn, ORNL-1089(1951).

Ta^{181} 73 108

μ 1.9 S
Q +5.9

B.M.Brown, D.H.Tamboulian, Phys. Rev. 88, 1158 (1952).

Ta^{182} 73 109

γ

0.9†	0.065714	1.9†	0.17936
10.0†	0.067736	0.9†	0.19830
0.6†	0.084667	4.5†	0.22205
4.6†	0.10009	2.4†	0.22927
0.9†	0.11366	2.7†	0.26409
0.2†	0.11640	35.2†	1.121
4.3†	0.15241	15.7†	1.188
1.4†	0.15637	33.4†	1.223

No Hf x ray Ta(pile n), cryst
Possible decay schemes enumerated

D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

W^{186} 74 112

$\tau_{\beta\beta}$ $> 6 \times 10^{15y}$ ppl
Assuming decay energy ≥ 2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

W^{187} 74 113

γ 0.07200 cryst
0.13425
0.4795
0.6189
0.6861
0.6189γ not crossover

D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

γ 0.072 $\alpha_K \sim 2^*$ $\alpha < 2.5^*$ E1 pc
0.134 $\alpha_K \sim 2^*$ M1
0.480
0.552
0.686 E1
0.78
(0.48γ)(0.13γ) (0.55γ)(0.13γ) (0.78γ)(0.13γ)
No (0.618γ) (γ)
No 0.206γ (<3% of 0.134γ)
0.48γ precedes 0.072γ

A.W.Sunyar, BAPS 28, 1, Z3(1953); * verbal report.

Re

Neutron resonance (ev) cryst s
2.16

H.H.Landon, V.L.Sailor, H.L.Foote, Jr., BAPS 28, 1, M8(1953).

Os^{185} 76 109

γ 0.654 Os (pile n); sl ce^-
0.88

J.B.Swan, R.D.Hill, Phys. Rev. 88, 831(1952).

Os^{191} 76 115 14^h

τ_1 14^h Os(≤22-Mev γ) Os(pile n)
No β^- (<5%) $s\pi$
γ I.T. 0.0742 $s\pi$ ce^- (Os)
$L_I : L_{II} : L_{III} : M_I : M_{III} : N$
42 : 24 : 100 : 14 : 35 : 15

J.B.Swan, R.D.Hill, Phys. Rev. 88, 831(1952).

γ (0.074) E3(73%) M4(27%)
From α_L's, e_L^-(0.074 I.T. γ)/e_L^-(0.13 g.s. γ), and (Os K x ray)/(Ir K x ray) when produced by Os(n,γ)

R.D.Hill, J.W.Mihelich, Phys. Rev. 89, 323(1953).

15.0^d

τ_2 15^d Os(≤22-Mev γ) Os(pile n)
β^- ~0.14 $s\pi$
γ_1 50%* 0.0417 E2
γ_2 100%* 0.1291 M1,E2
$K : L_I : L_{II} : L_{III} : M_I : M_{II} : M_{III} : N$
γ_1 32 : 40 : — : 11 : 19 : 9.5
γ_2 100 : 30 : 11 ; 6.0 : —12— : 3.5
[e_L^-(0.129γ)] [e_L^-(0.042γ)]
*Assuming M1/E2 = 3 for 0.129γ

J.B.Swan, R.D.Hill, Phys. Rev. 88, 831(1952).

Os^{192} 76 116

$\tau_{\beta\beta}$ $>10^{14y}$ ppl
Assuming decay energy $\geqslant$2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Os^{193} 76 117

τ 32^h Os(pile n),
β^- $\sim$1 not Os($\leqslant$22-Mev γ); a
Weak γ's with $14^h < \tau < 15^d$
$\sim$0.065 0.215 0.323 0.460

J.B.Swan, R.D.Hill, Phys. Rev. 88, 831(1952).

Ir

Neutron resonance (ev) cryst s
0.654

H.H.Landon, V.L.Sailor, H.L.Foote, Jr., BAPS 28, 1, W8(1953).

Ir^{192} 77 115 1.4^m

γ (0.057) α_L>400 Ir(pile n); pc
Ir L x ray but no unconverted γ found

J.H.Kahn, ORNL-1089(1951).

70^d

γ	0.4†	0.13633	30.0†	0.46798
	1.0†	0.20131	1.1†	0.4848
	7.5†	0.20574	1.1†	0.5884
	38.0†	0.29594	1.4†	0.6045
	37.0†	0.30845	0.5†	0.6129
	99.0†	0.31646		

Os K x ray Pt K x ray Ir(pile n), cryst
Level scheme given

D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

γ	2^+	0.200	100^+	0.467	sl pe$^-$
	3^+	0.205	5^+	0.486	
	50^+	0.295	10^+	0.589	
	50^+	0.307	30^+	0.606	
	100^+	0.315			

J.L.Wolfson, Proc. Roy Soc. Canada 44, 193A (1950).

Pt^{198} 78 120

$\tau_{\beta\beta}$ $>10^{15y}$ ppl
Assuming decay energy $\geqslant$2 Mev

J.H.Fremlin, M.C.Walters, Proc. Phys. Soc. 65A, 911(1952).

Au

Neutron resonance (ev) cryst s
4.93

H.H.Landon, V.L.Sailor, H.L.Foote, Jr., BAPS 28, 1, W8(1953).

Neutron resonance
4.85 ev

A.W.Merrison, E.R.Wiblin, Proc. Roy. Soc. 215A, 278(1952).

Au^{195} 79 116 30^s

τ 30^s d 38^hHg chem
γ 0.056 sl ce$^-$
0.259

O.Huber, R.Joly, P.Scherrer, N.F.Verster, Helv. Phys. Acta 25, 621(1952).

Au^{198} 79 119

β^- 0.958 sl
1.370 ΔI = 3, yes

J.L.Wolfson, L.G.Elliott, Proc. Roy. Soc. Canada 46, 142A(1952).

γ 0.411770 $\pm$ 0.000036 cryst

D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond Phys. Rev. 88, 775(1952).

γ 0.41173 $\pm$ 0.00007 $s\pi\sqrt{2}$ ce$^-$
Compared with 0.51084 Th L line in Tl^{208}

A.Hedgran, D.Lind, Arkiv Fysik 5, 177(1952).

Au^{200} 79 121

τ 48^m Hg^{201}($\leqslant$28-Mev γ) chem
β^- 2.2 a
γ 0.39 scin
1.13
$\beta/\gamma = 5$

F.D.S.Butement, R.Shillito, Proc. Phys. Soc. 65A, 945(1952).

Au^{201} 79 122

τ 26^m Hg^{202}($\leqslant$28-Mev γ) chem
β^- 1.5 a
γ 0.55 scin
$\beta/\gamma = 20$

F.D.S.Butement, R.Shillito, Proc. Phys. Soc. 65A, 945(1952).

Au^{202} ? 79 123

τ $\sim 25^s$ Hg(18-Mev n) chem

F.D.S.Butement, R.Shillito, Proc. Phys. Soc. 65A, 945(1952).

Au^{203} 79 124

τ 55^s Hg^{204}($\leqslant$28-Mev γ) chem
β^- 1.9 a
γ 0.69 scin
$\beta/\gamma = 10$

F.D.S.Butement, R.Shillito, Proc. Phys. Soc. 65A, 945(1952).

Hg

Neutron resonances (ev) E_n = 3 ev to 10 kev

E_0	$\sigma_0\Gamma^2$
23.3	9
35.4	170
191	
$\sim$350	

E.R.Hodgson, J.F.Gallagher, E.M.Bowey, Proc. Phys. Soc. 65A, 992(1952).

Hg^{195} 80 115 38^h

γ 0.036 Au(25-Mev d) chem
γ I.T. 0.122 sl ce$^-$

O.Huber, R.Joly, P.Scherrer, N.F.Verster, Helv. Phys. Acta 25, 621(1952).

9.5^h

τ_2 9.5^h Au(25-Mev d) chem
γ 0.061 sl ce$^-$
ce$^-$ 0.099

O.Huber, R.Joly, N.F.Verster, Helv. Phys. Acta 25, 621(1952).

Hg^{200} 80 120
Capture γ $Hg^{199}(n,\gamma)$ ~0.28 sπ ce$^-$
C.T.Hibdon, C.O.Muehlhause, Phys. Rev. 88, 943 (1952); 87, 222A(1952).

Tl^{204} 81 123
β^- 98.5% 0.760 $\Delta I=2$, yes shape 4πscin
ϵ ~1.5%
$E_{dis}(\epsilon)$ ~0.4 (calc)
No 0.37γ (<10^{-2}%)
E.der Mateosian, A.Smith, Phys. Rev. 88, 1186 (1952).

Tl^{208} 81 127
γ (2.62) $\alpha_{pair}=4.3\times10^{-4}$ E2 s
H.Slätis, K.Siegbahn, Arkiv Fysik 4, 485(1952).

γ 0.05† 0.27735 Th^{228}source, cryst
0.15† 0.5108
0.40† 0.5830
0.24098γ (0.10†) unassigned
†Relative to 0.238γ of Pb^{212}
D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

Tl^{209} 81 128
β^- 1.99 d 10^dAc; s
F.Wagner, Jr., M.S.Freedman, D.W.Engelkemeir, L.B.Magnusson, Phys. Rev. 88, 171A(1952).

Pb
Variations in relative isotopic abundances
C.B.Collins, R.M.Farquhar, R.D.Russell, Phys. Rev. 88, 1275(1952).

Pb^{201} ? 82 119 50^s
τ_1 50^s Tl(p) chem, not Hg(p)
γ ~1† 0.25 scin
~1† 0.42
~4† 0.67
N.J.Hopkins, Phys. Rev. 88, 680(1952).

Pb^{202} ? 82 120 5.6^s
τ_1 5.6^s Tl(p), not Hg(p)
γ 0.89 scin
N.J.Hopkins, Phys. Rev. 88, 680(1952).

Pb^{207} 82 125 0.8^s
τ_1 0.80^s
N.J.Hopkins, Phys. Rev. 88, 680(1952).

Pb^{209} 82 127
β^- 0.63 d 10^dAc chem; s, scin
F.Wagner, Jr., M.S.Freedman, D.W.Engelkemeir, L.B.Magnusson, Phys. Rev. 88, 171A(1952).

Pb^{210} 82 128
γ 0.04652 cryst
No other γ's from 0.016 to 0.062 (<2%)
G.T.Ewan, M.A.S.Ross, Nature 170, 760(1952).

Pb^{210} 82 128
γ ~10† 0.0464 $\alpha=8.5$ pc sπ
$L_I : L_{II} : L_{III} : M : NO$
100 : 7.5 : 0.7 : 26 : 7.7
No other γ (<0.5%)
†Photons per 100 disintegrations
C.S.Wu, F.Boehm, E.Nagel, BAPS 28, 1, Z4(1953); verbal report.

Pb^{212} 82 130
τ 10.67^h
H.Buttar, Naturwiss. 39, 575(1952).

γ 0.23860 cryst
D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

Pb^{214} 82 132
γ 0.053226 Rn^{222} source, cryst
20† 0.24192
55† 0.29522
100† 0.35199
D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

Bi^{209} 83 126
τ 2×10^{17y} ppl
α 2.9
7 α tracks, $E_\alpha=2.9$, in Bi impregnated plate kept 100 days in N_2, 18°C
W.Riezler, W.Porschen, Z. Naturforsch. 7a, 634 (1952).

Very few low energy α's in Bi loaded plate
τ of 2×10^{17y}, E_α of 3 Mev not confirmed
E.P.Hincks, C.H.Millar, Proc. Roy. Soc. Canada 46, 143A(1952).

$\overline{Bi}^{210}$ 83 127 4.9^d
No ce$^-$, no nuclear γ pc sπ
C.S.Wu, F.Boehm, E.Nagel, BAPS 28, 1, Z4(1953).

Bi^{212} 83 129
γ 0.15† 0.729 Th^{228} source, cryst
†Relative to 0.238γ of Pb^{212}
D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

(6.04α) (0.04γ) (θ) b=1.30 I=1,3,4 or 1,4,5
J.Horton, R.Sherr, BAPS 28, 1, Z5(1953).

Bi^{213} 83 130
β^- 0.96 d 10^dAc chem; s
1.39
γ 0.120
0.435
(1.39β) (0.12γ)
F.Wagner, Jr., M.S.Freedman, D.W.Engelkemeir, L.B.Magnusson, Phys. Rev. 88, 171A(1952).

Bi^{214} 83 131
γ 1.6† 0.6094 Rn^{222} source, cryst
†Relative to 0.352γ of Pb^{214}
D.E.Muller, H.C.Hoyt, D.J.Klein, J.W.M.DuMond, Phys. Rev. 88, 775(1952).

$\gamma\gamma(\theta)$ b ~0.3
F.Demichelis, R.Malvano, Nuovo Cimento 9, 1106 (1952).

Ra^{226} 88 138
α 5.7% (4.611) s, ppl
No α's from 3.6 to 4.4 (<0.02%)* ic
F.Asaro, I.Perlman, Phys. Rev. 88, 129(1952).
*A.Ghiorso, ibid.

Ra^{226} 88 138
γ (0.186) $\alpha = 0.9^*$ E2 αe^-
*Assuming 4.611α in 6.4% of disintegrations

C.Victor, J.Teillac, P.Falk-Vairant, G.Boussieres, J. phys. radium 13, 565(1952).

Ra^{227} 88 139
τ 41.2^m $Ra^{226}(n,\gamma)$
β^- 1.30
γ 0.29
0.50

J.P.Butler, J.S.Adam, quoted by B.W.Sargent, Nature 170, 832(1952).

Th
Neutron resonances (ev) $E_n = 2$ ev to 2 kev
25 $\sigma_o\Gamma^2 = 64$
80
170

E.R.Hodgson, J.F.Gallagher, E.M.Bowey, Proc. Phys. Soc. 65A, 992(1952).

Th^{228} 90 138
γ (0.084) $\alpha = 12^*$ E2 αe^-
*Based on $\gamma/\alpha = 0.02^{**}$

C.Victor, J.Teillac, P.Falk-Vairant, G.Boussieres, J. phys. radium 13, 565(1952); **M.Riou, ibid.

Th^{230} 90 140
γ 100^+ 0.068 scin
14^+ 0.142
5^+ 0.255
0.615γ due to Bi^{214} impurity*
+Photons per 10^4 disintegrations

F.Rasetti, E.C.Booth, BAPS 28, 1, 26(1953); *priv. comm.

Th^{232} 90 142
γ 0.075 ppl
$e^-/\alpha = 0.2$

G.Albouy, J. phys. radium 13, 309(1952).

Pa^{231} 91 140
γ 0.044 cc
0.066

J.Teillac, Ann. Phys. 7, 396(1952).

γ 0.0336 sπ ce$^-$
0.0380
0.0569
0.0635
0.0822

	Rel. intensity of ce$^-$
0.102	$L_{II} : L_{III} : M = 2:2:2$
0.198	$K : L = 1:5$
0.259	$K : L = 2:1$
0.301	$K : L : M = 100 : 20 : 7$
0.331	$K : L : M = 60 : 10 : 1$
0.357	$K : L = 10$
0.383	$K = 5$

P.Falk-Vairant, Compt. rend. 235, 796(1952).

Pa^{234} 91 143 1.14^m
τ 1.175^m

F.Barendregt, Sj.Tom, Physica 17, 817(1951).

U^{233} 92 141
γ 5† 0.0428 pc
1† 0.0561
(L x ray)/$\alpha = 0.04$
†Photons per 10^4 α's

D.West, J.K.Dawson, C.J.Mandleberg, Phil. Mag. 43, 875(1952).

γ_1 ~0.040 ppl
γ_2 (0.056)
γ_3 (0.099)
$\alpha + e_1^-$, $\alpha + e_1^- + e_2^-$, $\alpha + e_3^-$ tracks
$(\alpha + e_1^-)/(\alpha + e_1^- + e_2^-) \sim 70$ $(\alpha + e^-)/\alpha = 0.09$

K.M.Bisgård, Proc. Phys. Soc. 65A, 677(1952).

U^{234} 92 142
τ $2.475 \times 10^{5\,y}$ chem, ms; ic
± 0.016 95.99% U^{234}

E.H.Fleming, Jr., A.Ghiorso, B.B.Cunningham, Phys. Rev. 88, 642(1952).

U^{235} 92 143
τ $7.13 \times 10^{8\,y}$ chem, ms; ic
± 0.16 99.94% U^{235}

E.H.Fleming, Jr., A.Ghiorso, B.B.Cunningham, Phys. Rev. 88, 642(1952).

U^{236} 92 144
τ $2.391 \times 10^{7\,y}$ chem, ms; ic
± 0.018 96.65% U^{236}

E.H.Fleming, Jr., A.Ghiorso, B.B.Cunningham, Phys. Rev. 88, 642(1952).

U^{239} 92 147
γ 0.074 $\alpha_L = 0.20$ U(pile n); pc

J.H.Kahn, ORNL-1089(1951).

Pu^{238} 94 144
γ 6† 0.013 a
11† 0.018
0.4† 0.042
~0.17
†Photons per 10^2 α's

G.W.Reed, Jr., AECD-3185(1947); NSA 5-5421(1951).

γ 0.0450 pc

D.West, J.K.Dawson, C.J.Mandleberg, Phil. Mag. 43, 875(1952).

α 11% 5.100 s
20% 5.137
69% 5.150
No other α's from 4.82 to 5.57 Mev (<0.3%)

F.Asaro, I.Perlman, Phys. Rev. 88, 828(1952).

Pu^{239} 94 145
γ 2† 0.0385 pc
7† 0.0520
(K x ray)/$\alpha = \sim 2 \times 10^{-5}$ (L x ray)/$\alpha = 0.04$
†Photons per 10^5 α's

D.West, J.K.Dawson, C.J.Mandleberg, Phil. Mag. 43, 875(1952).

	γ	40^{+}	0.039	pc
		140^{+}	0.053	sl ce^{-}, pc
		110^{+}	0.100	scin
		50^{+}	0.124	scin
		30^{+}	0.384	scin

M.S.Freedman, F.Wagner, Jr., D.W.Engelkemeir, Phys. Rev. 88, 1155(1952).

U L x ray/α = 3×10^{-2} pc

M.Israel, Phys. Rev. 88, 682(1952).

Pu^{240} 94 146	α	24%	5.118	Pu(pile n) ms; s
		76%	5.162	

F.Asaro, I.Perlman, Phys. Rev. 88, 828(1952).

γ 0.050 Pu^{239}(pile n); sl ce^{-}

M.S.Freedman, F.Wagner, Jr., D.W.Engelkemeir, Phys. Rev. 88, 1155(1952).

Pu^{241} 94 147	β^{-}		0.0205	Pu^{240}(pile n); sl
	γ	100^{+}	0.100	(K x ray?) scin
		20^{+}	0.145	

$^{+}$Photons per 10^{7} β's

M.S.Freedman, F.Wagner, Jr., D.W.Engelkemeir, Phys. Rev. 88, 1155(1952).

Am^{241} 95 146	γ	25^{+}	0.0264	Pu^{240}(pile n,$\gamma\beta^{-}$); pc
			0.041	sl ce^{-}
		100^{+}	0.059	sl ce^{-}, pc

M.S.Freedman, F.Wagner, Jr., D.W.Engelkemeir, Phys. Rev. 88, 1155(1952).

γ 0.0603 d 10^{y}Pu; pc

D.West, J.K.Dawson, C.J.Mandleberg, Phil. Mag. 43, 875(1952).

NEUTRON CROSS SECTIONS

Reaction	σ Type	Value	Energy	Ref.
H(n)	σ_t as f(T) for H_2		~0.034 ev	52g2
	σ_t	3.38	1.32	53s1
	σ_t	0.686	14.1	52c1
	σ_t	0.074 - 0.0413	97 - 220	52m1
	σ_t	0.037	390	53h1
He(n)	σ_t	1.02	14.1	52c1
	σ_t	0.200	84	53h2
$Li^6(n,t)He^4$		25 mb	14	53f1
$Li^6(n,d)He^5$		~140 mb*	14.2	52r1
$Li^6(n,d)He^5$ g.s.		80 mb	14	53f1
$Li^6(n,d)He^5$ excited		81 mb	14	53f1
$Li^6(n,p)He^6$		6 mb	14	53f1
$Li^6(n,p)$	$\sigma(0.83^{s}He)$	6.7 mb	14	52b1

*Erroneously reported as ~14 mb, NSA 6, #20(1952).

Neutron Cross Sections - continued

Reaction	σ Type	Value	Energy	Ref.
$Li^6(n)$	σ_t	1.39	14.1	52c1
$Li^7(n,t)He^5$		53 mb	14	53f1
$Li^7(n,d)$	$\sigma(0.83^{s}He)$	9.8 mb	14	52b1
$Li^7(n)$	σ_t	1.45	14.1	52c1
$Be^9(n,\alpha)$	$\sigma(0.83^{s}He)$	10 mb	14	52b1
$Be^9(n)$	σ_t	1.53	14.1	52c1
B(n,<11.5n) 82% B^{10}	σ_{in}	0.69	14	52p2
(n, <2.6n)		0.24		
$B^{10}(n)$	σ_t	1.47	14.1	52c1
$B^{11}(n)$	σ_t	1.40	14.1	52c1
C(n,<11.5n)	σ_{in}	0.76	14	52p2
(n, <2.6n)		0.28		
$C^{12}(n,2n)$	$\sigma(20^{m}C)$	graph	24 - 27	52b1
C(n)	σ_t	2.21	1.32	53s1
	σ_t	1.32	14.1	52c1
	σ_t	0.502 - 0.297	97 - 220	52m1
	σ_t	0.287	390	53h1
N(n,<11.5n)	σ_{in}	0.79	14	52p2
(n, <2.6n)		0.46		
N(n)	σ_t	1.59	14.1	52c1
O(n)	σ_t	1.58	14.1	52c1
F(n)	σ_t	1.70	14.1	52c1
Na(n)	σ_t	1.71	14.1	52c1
	σ_t	graph	0.12 - 1	52s1
Mg(n)	σ_t	1.75	14.1	52c1
Al(n,<11.5n)	σ_{in}	1.06	14	52p2
(n, <2.6n)		0.52		
Al(n)	σ_t	1.38	5ev - 5kev	52m4
	σ_t	1.73	14.1	52c1
$Al^{27}(n,\alpha)$	$\sigma(15.0^{h}Na)$	0.135	14.1	52f1
$Al^{27}(n,p)$	$\sigma(9.6^{m}Mg)$	0.079	14.1	52f1
Si(n)	σ_t	1.86	14.1	52c1
P(n)	σ_t	1.97	14.1	52c1
$P^{31}(n,p)$	$\sigma(2.6^{h}Si)$	0.091	14.1	52f1
S(n)	σ_t	2.06	13.3	52a1
	σ_t	1.92	14.1	52c1
$S^{33}(n,p)$	$\sigma(25^{d}P)$	2.3 mb	th	52W1
Cl(n)	σ_t	2.00	14.1	52c1

Neutron Cross Sections - continued

Reaction	σ Type	Value	Energy	Ref.
K(n)	σ_t	2.24	14.1	52c1
K^{39}(n)	σ_a	1.9	th	52p1
K^{40}(n)	σ_a	~ 65	th	52p1
K^{41}(n)	σ_a	1.2	th	52p1
Ca(n)	σ_t	2.19	14.1	52c1
Ti(n)	σ_t	2.28	14.1	52c1
Cr(n)	σ_t	2.45	14.1	52c1
Mn(n,γ)	σ(2.6^hMn)	12.0	th	52b2
Mn(n)	σ_t	2.54	14.1	52c1
Fe(n,<11.5n)	σ_{in}	1.45	14	52p2
(n, <2.6n)		1.21		
(n, <1.4n)		0.78		
Fe(n)	σ_t	2.60	14.1	52c1
	σ_t	graph	1 - 3.2	52m2
Fe^{56}(n,p)	σ(2.6^hMn)	0.124	14.1	52f1
Co(n)	σ_t	graph	1ev - 5kev	52m4
	σ_t	2.72	14.1	52c1
Co^{59}(n,γ)	σ(10^mCo)	19	th	52m3
Ni(n)	σ_t	graph	5ev - 5kev	52m4
Ni(n)	σ_t	2.67	14.1	52c1
	σ_t	graph	1 - 3.2	52m2
Ni^{58}(n)	σ_a	4.2	th	52p1
Ni^{60}(n)	σ_a	2.5	th	52p1
Ni^{61}(n)	σ_a	2	th	52p1
Ni^{62}(n)	σ_a	15	th	52p1
Cu(n,<11.5n)	σ_{in}	1.51	14	52p2
(n, <2.6n)		1.32		
(n, <1.4n)		0.87		
Cu(n)	σ_t	graph	1 - 3.2	52m2
	σ_t	3.1	13.8	52a1
	σ_t	2.5	14	52g1
	σ_t	2.96	14.1	52c1
Cu^{63}(n,2n)	σ(10^mCu)	0.510	14.1	52f1
Cu^{63}(n,2n)	σ(10^mCu)	graph	12 - 27	52b2
Cu^{65}(n,2n)	σ(12.8^hCu)	0.970	14.1	52f1
Cu^{65}(n,p)	σ(2.56^hNi)	0.019	14.1	52f1
Zn(n)	σ_t	3.06	14.1	52c1
	σ_t	graph	1 - 3.2	52m2
Ga(n)	σ_t	graph	5ev - 5kev	52m4
	σ_t	3.19	14.1	52c1
Ga^{69}(n)	σ_a	2.0	th	52p1
Ga^{71}(n)	σ_a	4.9	th	52p1

Neutron Cross Sections - continued

Reaction	σ Type	Value	Energy	Ref.
Se(n)	σ_t	3.56	14.1	52c1
Se^{74}(n)	σ_a	50	th	52p1
Se^{76}(n)	σ_a	82	th	52p1
Se^{77}(n)	σ_a	40	th	52p1
Se^{78}(n)	σ_a	0.4	th	52p1
Se^{80}(n)	σ_a	0.59	th	52p1
Se^{82}(n)	σ_a	2	th	52p1
Br(n)	σ_t	3.52	14.1	52c1
Kr^{78}(n)	σ(34^hKr)	1.6	th	52b5
Sr(n)	σ_t	graph	0.05 - 3.2	52m2
	σ_t	3.68	14.1	52c1
Sr^{84}(n,γ)	σ(65^dSr)	0.32	th	52h2
Y(n)	σ_t	graph	0.05 - 3.2	52m2
	σ_t	3.88	14.1	52c1
Zr(n)	σ_t	graph	1 - 3.2	52m2
	σ_t	3.6	14	52g1
	σ_t	4.00	14.1	52c1
Nb(n)	σ_t	graph	0.12 - 3.2	52m2
	σ_t	4.02	14.1	52c1
Mo(n)	σ_t	graph	1ev - 10kev	52h5
	σ_t	graph	0.02 - 3.2	52m2
	σ_t	4.04	14.1	52c1
Mo^{92}(n)	σ_a	< 0.3	th	52p1
Mo^{92}(n,2n)	σ(15.5^mMo)	graph	13.2 - 27	52b2
Ag(n)	σ_t	graph	12ev - 5kev	52m4
	σ_t	graph	1 - 3.2	52m2
	σ_t	4.34	14.1	52c1
Ag^{107}(n,2n)	σ(24.5^mAg)	0.56	14.1	52f1
Ag^{109}(n,2n)	σ(2.3^mAg)	1.0	14.1	52f1
Cd(n,<11.5n)	σ_{in}	1.89	14	52p2
(n, <2.6n)		1.66		
(n, <1.4n)		1.14		
Cd(n)	σ_t	7800	0.18 ev	52b3
	σ_t	4.44	14.1	52c1
In(n)	σ_t	graph	1 - 3.2	52m2
	σ_t	4.53	14.1	52c1
Sn(n)	σ_t	graph	1 - 3.2	52m2
	σ_t	4.68	14.1	52c1
Sb(n)	σ_t	graph	1 - 3.2	52m2
	σ_t	4.71	14.1	52c1
Sb^{121}(n)	σ_a	5.7	th	52p1

Neutron Cross Sections - continued

Reaction	σ Type	Value	Energy	Ref.
Te (n)	σ_t	4.9	14.1	52c1
I (n)	σ_t	graph	5ev - 5kev	52m4
	σ_t	graph	1 - 3.2	52m2
	σ_t	4.7	14.1	52c1
Ba (n)	σ_t	graph	0.05 - 3.2	52m2
	σ_t	5.2	14.1	52c1
La (n)	σ_t	graph	0.02 - 3.2	52m2
	σ_t	5.2	14.1	52c1
Ce (n)	σ_t	graph	0.02 - 3.2	52m2
	σ_t	5.1	14.1	52c1
Pr (n)	σ_t	graph	0.05 - 3.2	52m2
	σ_t	4.9	14.1	52c1
Nd^{142} (n)	σ_a	18	th	52p1
Nd^{143} (n)	σ_a	290	th	52p1
Nd^{144} (n)	σ_a	4.8	th	52p1
Nd^{145} (n)	σ_a	52	th	52p1
Nd^{146} (n)	σ_a	9.8	th	52p1
Nd^{148} (n)	σ_a	$\sim$3.3	th	52p1
Nd^{150} (n)	σ_a	$\sim$3	th	52p1
Hf^{174} (n)	σ_a	$\sim$500	th	52p1
Hf^{176} (n)	σ_a	$\sim$15	th	52p1
Hf^{177} (n)	σ_a	380	th	52p1
Hf^{178} (n)	σ_a	70	th	52p1
Hf^{179} (n)	σ_a	$\sim$50	th	52p1
Hf^{180} (n)	σ_a	$\sim$13	th	52p1
Ta (n)	σ_t	graph	1 - 3.2	52m2
	σ_t	5.2	14.1	52c1
W (n)	σ_t	graph	1 - 3.2	52m2
	σ_t	5.3	14.1	52c1
Pt (n)	σ_t	5.4	14.1	52c1
Au(n, <11.5n)	σ_{in}	2.51	14	52p2
(n, <2.6n)		2.06		
(n, <1.4)		1.47		
Au (n)	σ_t	5.3	14.1	52c1
Hg(n)	σ_t	graph	3ev - 10kev	52h5
	σ_t	5.4	14.1	52c1
Tl (n)	σ_t	5.4	14.1	52c1

Neutron Cross Sections - continued

Reaction	σ Type	Value	Energy	Ref.
Pb(n, <11.5n)	σ_{in}	2.56	14	52p2
(n, <2.6n)		2.29		
(n, <1.4n)		0.91		
Pb (n)	σ_t	graph	1 - 3.2	52m2
	σ_t	5.4	14.1	52c1
Pb^{204} (n)	σ_a	$\sim$0.9	th	52p1
Pb^{206} (n)	σ_a	$\sim$0.1	th	52p1
	σ_t	graph	1 - 3.2	52m2
Pb^{207} (n)	σ_a	0.70	th	52p1
Pb^{208} (n)	σ_a	$\leq$0.3	th	52p1
Bi(n, <11.5n)	σ_{in}	2.56	14	52p2
(n, <2.6n)		2.28		
(n, <1.4n)		1.03		
Bi (n)	σ_t	graph	1 - 3.2	52m2
	σ_t	5.5	14.1	52c1
$Ra^{226}(n,\gamma)$	$\sigma(42^{m}Ra^{227})$	22	th ?	52b4
Th(n)	σ_t	graph	2ev - 2kev	52h5
	σ_t	6.11	13.9	50l1
U (n)	σ_s coh	9.0	th	51s1
	σ_t	9.0	th	51s1
	σ_t	5.9	14.1	52c1
	σ_t	5.7	14.1	52c1

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GROUND STATE Q'S

Reaction	Standard	Value	Method	Ref.
$Be^9(p,\alpha)Li^6$	$Li^7(p,n)$	+ 2.126* ± 0.004	EA	52c3
$B^{10}(p,\alpha)Be^7$	$Li^7(p,n)$	+ 1.147 ± 0.0025	EA	52c3
$B^{10}(p,He^3)Be^8$	$Li^7(p,n)$	− 0.536 ± 0.003	EA	52c3
$N^{14}(d,p)N^{15}$	$Po^{212}\ \alpha$	+ 8.613 ± 0.011	s	52m5
$O^{16}(d,\alpha)N^{14}$	$Li(p,n)$	+ 3.113 ± 0.0035	EA	52c3
$O^{18}(p,\alpha)N^{15}$	$Be^9(d,\alpha)$	+ 3.96 ± 0.04	s	51s2
$F^{19}(\alpha,p)Ne^{22}$		+ 1.57	ppl	52h6
$Ne^{21}(p,n)Na^{21}$	$F^{19}(p,n)$	− 3.765		52k1
$Ne^{21}(d,\alpha)F^{19}$	$Bi^{212}\ \alpha$	+ 6.432 ± 0.010	s	52m5
$Ne^{21}(d,p)Ne^{22}$	$Po^{212}\ \alpha$	+ 8.137 ± 0.011	s	52m5
$Ne^{22}(p,n)Na^{22}$	$F^{19}(p,n)$	− 3.913		52k1
$Na^{23}(d,p)Na^{24}$	$Bi^{212}\ \alpha$	+ 4.723 ± 0.008	s	52m5
$Na^{23}(d,p)Na^{24}$	$Po\ \alpha$	+ 4.731 ± 0.007	ppl	52s2
$Na^{23}(\alpha,p)Mg^{26}$		+ 1.55	ppl	52h6
$Mg^{24}(\alpha,p)Al^{27}$		− 1.613 ± 0.010	s	52k2
$Al^{27}(\alpha,p)Si^{30}$		+ 2.26 ± 0.05	ppl	51r1
$Cl^{35}(d,p)Cl^{36}$		+ 6.3		52K3
$Ti^{46}(d,p)Ti^{47}$	$O^{16}(d,p)$	+ 6.45 ± 0.05	range	52p4
$Ti^{47}(d,p)Ti^{48}$	$O^{16}(d,p)$	+ 8.14 ± 0.05 ?	range	52p4
$Ti^{48}(d,p)Ti^{49}$	$O^{16}(d,p)$	+ 5.81 ± 0.04	range	52p4
$Ti^{49}(d,p)Ti^{50}$	$O^{16}(d,p)$	+ 8.62 ± 0.05	range	52p4
$Ti^{50}(d,p)Ti^{51}$	$O^{16}(d,p)$	+ 4.11 ± 0.07	range	52p4
$V^{51}(d,p)V^{52}$		+ 6.25	a, pc	51h1

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PACKING FRACTION DIFFERENCES

Δf, in Units 10^{-4} amu

Doublet	Δf	Ref.
$Ni^{61} - Te^{122}$	−3.43 ± 0.05	52h4
$Ni^{62} - Te^{124}$	−3.71 ± 0.03	52h4
$Ni^{64} - Te^{128}$	−3.81 ± 0.05	52h4
$Cu^{65} - Te^{130}$	−3.95 ± 0.03	52h4
$A^{40} - C_2O$	−8.186 ± 0.005	52j1
$K^{40} - C_2O$	−7.78 ± 0.02	52j1
$Ca^{40} - C_2O$	−8.139 ± 0.002	52j1
$Pd^{102} - C_8H_3$	−13.933 ± 0.008	52h3
$Pd^{104} - C_8H_4$	−15.32 ± 0.01	52h3
$Pd^{105} - C_8H_9$	−15.78 ± 0.01	52h3
$Pd^{106} - C_4H_5$	−16.57 ± 0.02	52h3
$Pd^{106} - C_8H_{10}$	−16.52 ± 0.02	52h3
$Pd^{108} - C_4H_6$	−17.64 ± 0.01	52h3
$Pd^{110} - C_4H_7$	−18.65 ± 0.01	52h3
$Cd^{106} - C_4H_5$	−16.26 ± 0.01	52h3
$Cd^{108} - C_4H_6$	−17.58 ± 0.01	52h3
$Cd^{110} - C_4H_7$	−18.74 ± 0.01	52h3
$Cd^{111} - C_8H_{15}$	−19.203 ± 0.007	52h3
$Cd^{112} - C_4H_8$	−19.818 ± 0.009	52h3
$Cd^{112} - C_8H_{16}$	−19.860 ± 0.008	52h3
$Cd^{113} - C_8H_{17}$	−20.231 ± 0.008	52h3
$Cd^{114} - C_4H_9$	−20.82 ± 0.01	52h3
$Cd^{114} - C_3H_5O$	−14.44 ± 0.01	52h3
$Cd^{116} - C_3H_6O$	−15.41 ± 0.01	52h3

Packing Fraction Differences, Δf, in Units 10^{-4} amu (continued)

Doublet	Δf	Ref.
$In^{113} - C_8H_{17}$	-20.245 ± 0.009	52h3
$In^{115} - C_9H_7$	-13.148 ± 0.009	52h3
$Sn^{115} - C_9H_7$	-13.17 ± 0.02	52h3
$Sn^{116} - C_3H_6O$	-15.65 ± 0.02	52h3
$Sn^{116} - C_9H_8$	-13.83 ± 0.01	52h3
$Sn^{117} - C_9H_9$	-14.299 ± 0.008	52h3
$Sn^{118} - C_3H_7O$	-16.72 ± 0.02	52h3
$Sn^{118} - C_9H_{10}$	-14.94 ± 0.02	52h3
$Sn^{119} - C_9H_{11}$	-15.376 ± 0.009	52h3
$Sn^{120} - C_5$	$- 8.15 \pm 0.01$	52h3
$Sn^{122} - C_5H$	$- 9.20 \pm 0.01$	52h3
$Sn^{124} - C_5H_2$	-10.169 ± 0.008	52h3
$Te^{120} - C_9H_{12}$	-15.79 ± 0.01	52h3
$Te^{122} - C_5H$	$- 9.244 \pm 0.007$	52h3
$Te^{122} - Ni^{61}$	$+ 3.43 \pm 0.05$	52h4
$Te^{123} - C_5H$	$+ 9.06 \pm 0.03$	52h3
$Te^{124} - C_5H_2$	-10.340 ± 0.008	52h3
$Te^{124} - Ni^{62}$	$+ 3.71 \pm 0.03$	52h4
$Te^{125} - C_5H_2$	$+10.16 \pm 0.03$	52h3
$Te^{126} - C_5H_3$	-11.359 ± 0.005	52h3
$Te^{128} - C_{10}H_8$	-12.273 ± 0.009	52h3
$Te^{128} - Ni^{64}$	$+ 3.81 \pm 0.05$	52h4
$Te^{130} - Cu^{65}$	$+ 3.95 \pm 0.03$	52h4
$Te^{130} - C_5H_5$	-13.180 ± 0.006	52h3
$I^{127} - C_{10}H_7$	-11.82 ± 0.01	52h3
$Xe^{124} - C_5H_2$	-10.098 ± 0.005	52h3
$Xe^{126} - C_5H_3$	-11.31 ± 0.01	52h3
$Xe^{128} - C_{10}H_8$	-12.432 ± 0.006	52h3
$Xe^{129} - C_3H_7$	-20.12 ± 0.01	52h3
$Xe^{130} - C_5H_5$	-13.451 ± 0.006	52h3
$Xe^{131} - CO_2$	$- 4.94 \pm 0.03$	52h3
$Xe^{132} - C_5H_6$	-14.394 ± 0.009	52h3
$Xe^{132} - CO_2$	$- 4.95 \pm 0.01$	52h3

Packing Fraction Differences, Δf, in Units 10^{-4} amu (continued)

Doublet	Δf	Ref.
$Xe^{134} - C_5H_7$	-15.257 ± 0.007	52h3
$Xe^{136} - C_5H_8$	-16.051 ± 0.006	52h3

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